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MAINTENANCE INTERVALS

Operation and Maintenance
Manual Excerpt

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CATERPILLAR®

SEBU6896-03
August 2000

Operation and Maintenance Manual

D7R Track-Type Tractor

2EN1-Up (Machine)
3DN1-Up (Machine)
5MR1-Up (Machine)
6ER1-Up (Machine)

Differential Steering

i01183534

Maintenance Interval Schedule

SMCS Code: 7000

Note: All safety information, warnings, and instructions must be read and understood before you perform any operation or any maintenance procedure.

Before each consecutive interval is performed, all of the maintenance requirements from the previous interval must also be performed.

When Required

Battery Electrolyte Level - Check 91
Battery, Battery Cable or Battery Disconnect Switch - Replace 91
Circuit Breakers - Reset 94
Cutting Edges and End Bits - Inspect/Replace 99
Engine Air Filter Primary Element - Clean/Replace 99
Engine Air Filter Secondary Element - Replace .. 101
Engine Air Precleaner - Clean 102
Equalizer Bar Pins - Inspect 105
Ether Starting Aid Cylinder - Replace 105
Front Idler Position - Check 107
Fuel System - Prime 107
Fuses - Replace 112
Oil Filter - Inspect 116
Radiator Core - Clean 117
Radiator Pressure Cap - Clean/Replace 118
Ripper Tip and Shank Protector - Inspect/ Replace 118
Transmission Scavenge Screen - Clean 127
Winch Wire Rope - Install 131
Window Washer Reservoir - Fill 132
Window Wipers - Inspect/Replace 132

Every 10 Service Hours or Daily

Backup Alarm - Test 90
Brakes, Indicators and Gauges - Test 92
Cab Filter (Fresh Air) - Clean/Inspect/Replace 94
Cooling System Level - Check 97
Engine Oil Level - Check 103
Fuel System Primary Filter/Water Separator - Drain 108
Fuel Tank Water and Sediment - Drain 111
Horn - Test 113
Hydraulic System Oil Level - Check 115
Seat Belt - Inspect 120
Transmission Oil Level - Check 127
Walk-Around Inspection 127
Winch Oil Level - Check 131
Windows - Clean 133

Every 50 Service Hours or Weekly

Cab Filter (Recirculation) - Clean/Inspect/ Replace 94
Pivot Shaft Oil Level - Check 117
Ripper Linkage and Cylinder Bearings - Lubricate 118
Track Pins - Inspect 122

Initial 250 Service Hours

Engine Valve Lash - Check 104
Transmission Oil Filter - Replace 125

Every 250 Service Hours or Monthly

Air Conditioner - Test 86
Air Conditioner Belt - Inspect/Adjust/Replace 86
Alternator and Fan Belts - Inspect/Adjust/ Replace 89
Angle Blade Manual Tilt Brace - Lubricate 90
Battery - Inspect 90
Braking System - Test 93
Engine Oil and Filter - Change 103
Equalizer Bar Pins - Lubricate 105
Fan Drive Pulley and Idler - Lubricate 106
Final Drive Oil Level - Check 106
Track Adjustment - Adjust 120
Track Adjustment - Check 122

Initial 500 Service Hours

Transmission Oil Filter - Replace 125

Every 500 Service Hours or 3 Months

Engine Crankcase Breather - Clean 102
Fuel System Primary Filter - Replace 109
Fuel System Secondary Filter - Replace 110
Fuel Tank Cap Filter and Strainer - Replace/Clean 111
Hydraulic System Oil Filter - Replace 114
Recoil Spring Compartment Oil Level - Check ... 118
Transmission Oil Filter - Replace 125
Winch Filter and Magnetic Strainer - Replace/Clean 129

Every 1000 Service Hours or 6 Months

Lift Cylinder Yoke Bearings - Lubricate 116
Rollover Protective Structure (ROPS) - Inspect .. 119
Torque Converter Scavenge Screen - Clean 120
Transmission Magnetic Screen - Clean 124
Transmission Oil - Change 124
Winch Oil - Change 130

Every 2000 Service Hours or 1 Year

Air Conditioner System - Check/Replace 88
Engine Valve Lash - Check 104
Engine Valve Rotators - Inspect 104
Final Drive Oil - Change 106
Hydraulic System Oil - Change 113

Track Roller Frame Guides - Inspect 123

Every Year

Air Conditioner In-Line Dryer - Replace 87

Every 3000 Service Hours or 2 Years

Cooling System Extended Life Coolant Extender - Add 96
Cooling System Water Temperature Regulator - Replace 98

Every 6000 Service Hours or 4 Years

Cooling System Extended Life Coolant - Change .. 95

i00074075

Air Conditioner - Test

SMCS Code: 7320-081

⚠ WARNING

Inhaling air conditioner refrigerant gas through a lit cigarette or other smoking method or inhaling fumes released from a flame contacting air conditioner refrigerant gas can cause bodily harm or death.

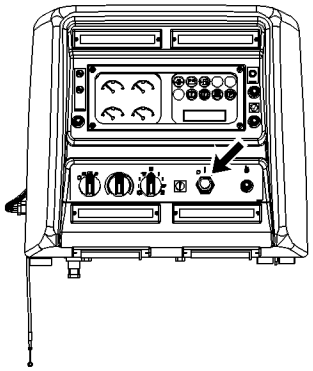


Illustration 149 g00104077

1. Start the engine. Operate the engine at HIGH IDLE.

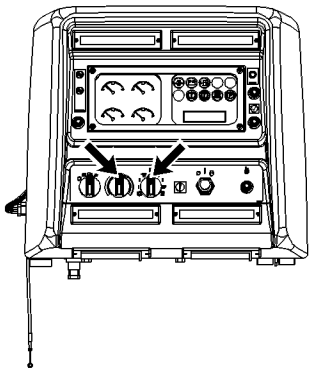


Illustration 150 g00104078

2. Set the air conditioner control for maximum cooling. Set the fan speed switch knob to the HIGH position.

3. To stabilize the air conditioning system, run the air conditioning system for two minutes.

4. Check for refrigerant in the system. Feel the suction line and the discharge line.

   If the system contains refrigerant, the discharge line is warmer than the suction line.

   If the system does not contain refrigerant or the system contains only a small amount of refrigerant, poor cooling will result.

5. Stop the engine.

i01321387

Air Conditioner Belt - Inspect/Adjust/Replace (If equipped)

SMCS Code: 1357-025; 1357-040; 1357-510

Inspect

1. Inspect the condition of the compressor drive belt. The belt should deflect 14 to 20 mm (.56 to .81 inch) under 110 N (25 lb) of force. Use a 144-0235 Belt Tension Gauge in order to measure the tension.

Adjust/Replace

1. Loosen compressor mounting bolts (1) and (2).

2. Loosen adjusting bracket nuts (3).

3. To achieve the correct belt tension, move the compressor inward or move the compressor outward. Tighten adjusting bracket nuts (3). Tighten compressor mounting bolts (1) and (2). Recheck the belt adjustment.

4. If necessary, repeat Step 1 to Step 3.

Note: Use the same procedure in order to replace the belt.

i01321512

Air Conditioner In-Line Dryer - Replace (If Equipped)

SMCS Code: 7322-510

⚠ WARNING

Personal injury can result from contact with refrigerant.

Contact with refrigerant can cause frost bite. Keep face and hands away to help prevent injury.

Protective goggles must always be worn when refrigerant lines are opened, even if the gauges indicate the system is empty of refrigerant.

Always use precaution when a fitting is removed. Slowly loosen the fitting. If the system is still under pressure, release it slowly in a well ventilated area.

Personal injury or death can result from inhaling refrigerant through a lit cigarette.

Inhaling air conditioner refrigerant gas through a lit cigarette or other smoking method or inhaling fumes released from a flame contacting air conditioner refrigerant gas, can cause bodily harm or death.

Do not smoke when servicing air conditioners or wherever refrigerant gas may be present.

Use a certified recovery and recycling cart to properly remove the refrigerant from the air conditioning system.

The in-line dryer is located behind the lower engine access door on the left side of the machine. The in-line dryer contains the orifice tube, a desiccant that dries the liquid refrigerant, and a tracer dye wafer.

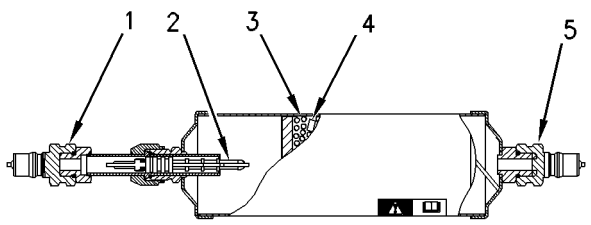


Illustration 151 g00676891

(1) Quick disconnect fitting for the “OUTLET” hose
(2) Orifice tube assembly
(3) Desiccant
(4) tracer dye wafer
(5) Quick disconnect fitting for the “INLET” hose

1. Stop the engine. Allow the air conditioning system to remain inactive for five minutes in order to equalize the pressure.
2. Disconnect the “INLET” hose from quick disconnect fitting (5) on the old dryer.
3. Connect the “INLET” hose to quick disconnect fitting (5) on the new dryer.
4. Add 30 mL (1 ounce) of refrigerant oil to the system.

Note: If you install a new air conditioner compressor, do not add 30 mL (1 ounce) of refrigerant oil to the system.

5. Start the engine and operate the air conditioning system for one minute in order to evacuate the refrigerant from the used dryer.
6. With the air conditioning system in operation, disconnect the “OUTLET” hose from quick disconnect fitting (1) on the old dryer.
7. Stop the engine. The air conditioning system must be idle for five minutes in order to equalize the pressure.
8. Connect the “OUTLET” hose that was disconnected in Step 6 to quick disconnect fitting (1) on the new dryer.

Also refer to the replacement procedure in the Service Manual Module, SENR-5664, “Air Conditioning and Heating”. Compliance with this procedure will provide the following benefits:

- The refrigerant compressor oil will not escape from the system.

- The amount of moisture that enters the system will be reduced.
- A sludge deposit will not form.
- It will not be necessary to top off the system with compressor oil or refrigerant.

Note: The R-134a refrigerant dryer should be replaced annually. Extremely humid operating conditions may require more frequent replacement of the dryer. The dryer should also be replaced if the air conditioning system has been leaking or if the system has been opened for service repair.

i01363439

Air Conditioner System - Check/Replace

SMCS Code: 7320-510; 7320-535

⚠ WARNING

Personal injury can result from contact with refrigerant.

This system is under pressure at all times, engine running or not. Heat should never be applied to a charged system.

Contact with refrigerant can cause frost bite. Keep face and hands away to help prevent injury.

Protective goggles must always be worn when refrigerant lines are opened, even if the gauges indicate the system is empty of refrigerant.

Always use caution when a fitting is removed. Slowly loosen the fitting. If the system is still under pressure, release it slowly in a well ventilated area.

Personal injury or death can result from inhaling refrigerant through a lit cigarette.

Inhaling air conditioner refrigerant gas through a lit cigarette or other smoking method or inhaling fumes released from a flame contacting air conditioner refrigerant gas, can cause bodily harm or death.

Do not smoke when servicing air conditioners or wherever refrigerant gas may be present.

Before any checks of the air conditioning and heating system are made, move the machine to a smooth horizontal surface. Lower all implements to the ground. Make sure the transmission is in neutral or park and that the parking brake is engaged. Keep all other personnel either away from the machine or where they can be seen.

Before you do a performance check of the air conditioning system, check the following items:

1. Check the condenser.

   a. Check for any type of restriction that will obstruct the air flow. Check for dirt, insects, plastic bags, etc.

b. With condensers that are mounted on the roof, always check that both the fan motors are running. Check for restrictions. A clean condenser will lead to longer life for the compressor.

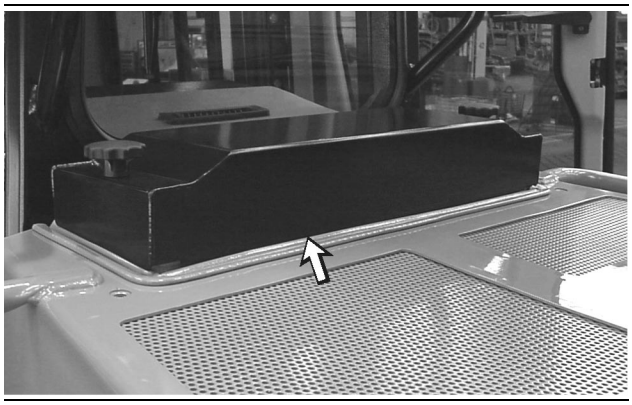


Illustration 152 g00737294

2. Clean the fresh air filters.

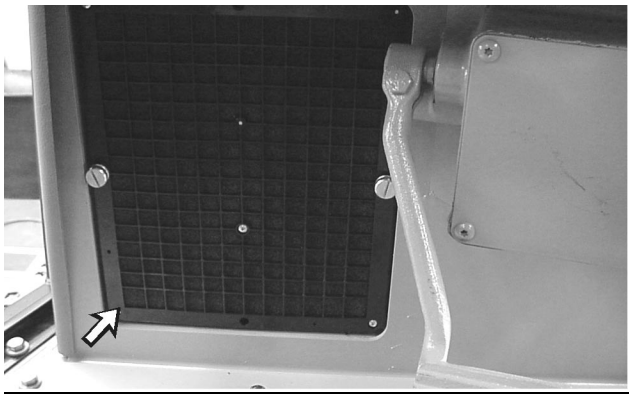


Illustration 153 g00737301

3. Clean the recirculation filters.

4. Replace the in-line dryer annually.

Reference: Refer to the topics of Service Manual, SENR5664, “Receiver (Refrigerant Dryer) Remove and Install” and of Service Manual, SENR5664, “In-Line Refrigerant Dryer- Remove and Install” in the Service Manual for your machine.

i00072461

Alternator and Fan Belts - Inspect/Adjust/Replace

SMCS Code: 1357-025; 1357-040; 1357-510

1. Open the access door on the right side of the machine.

Note: Even if only one belt is worn or damaged, replace the belts in sets.

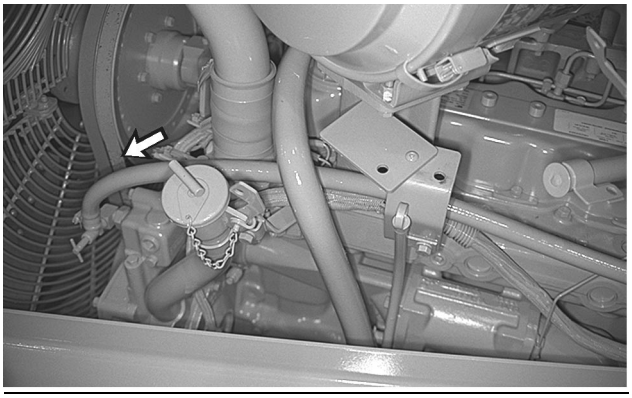


Illustration 154 g00103677

2. Inspect the condition of the fan and of the alternator belt. The belts should deflect 9 to 15 mm (.38 to .62 inch) under 110 N (25 lb) of force.

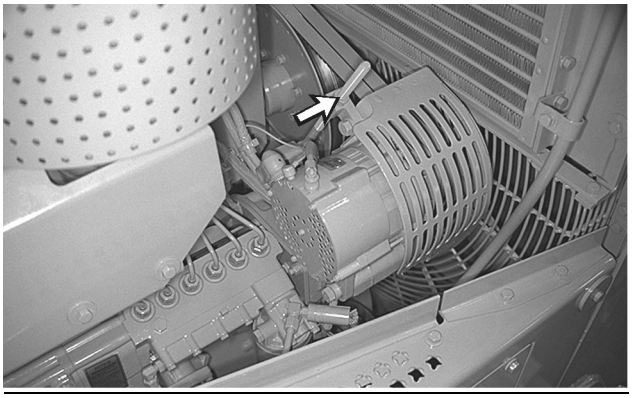


Illustration 155 g00103678

3. Loosen the adjusting locknut.

4. Turn the adjusting nut until the correct belt tension is reached. To achieve the correct belt adjustment, move the alternator inward or move the alternator outward, as required.

5. Tighten the adjusting locknut.

6. If new belts are installed, check the belt adjustment again after 30 minutes of engine operation.

7. Close the access door.

i01034553

Angle Blade Manual Tilt Brace - Lubricate

SMCS Code: 6074-086

If equipped:

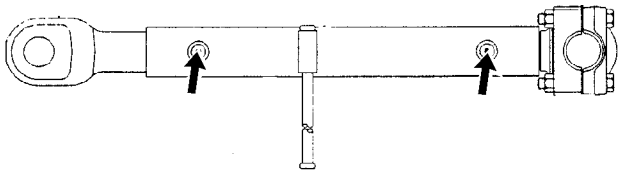


Illustration 156 g00103702

Lubricate the two fittings. Use Multipurpose Lithium Complex Grease with Molybdenum (MPGM).

i01309186

Backup Alarm - Test

SMCS Code: 7406-081

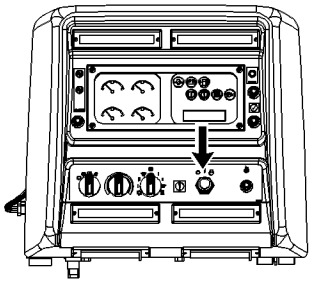


Illustration 157 g00103574

Turn the engine start switch to the ON position in order to perform the test.

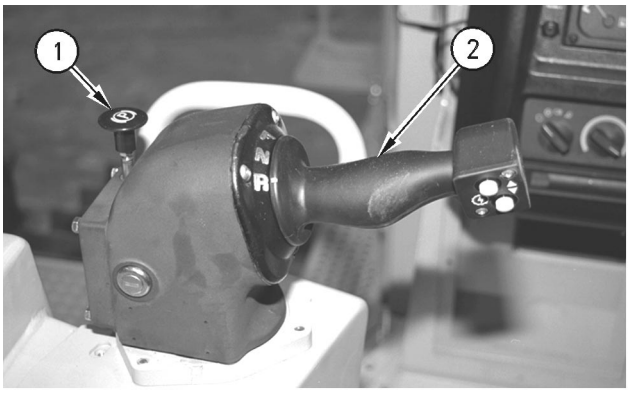


Illustration 158 g00339521

Apply the service brakes. Disengage parking brake switch (1). Move transmission direction selector (2) to the REVERSE position.

The backup alarm should sound immediately. The backup alarm should continue to sound until the transmission direction selector is moved to the NEUTRAL position or to the FORWARD position.

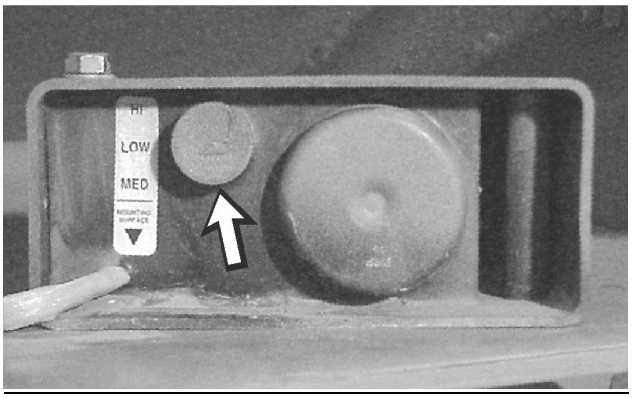


Illustration 159 g00637537

The toggle switch is located under the protective cap.

The backup alarm is on the rear, right side of the machine.

To adjust the sound level, move the toggle switch that is on the rear of the backup alarm. The backup alarm is set at the highest sound level when the machine is shipped from the factory. The adjustment knob should remain at the HIGH position unless the job site requires a lower sound level.

i00998344

Battery - Inspect

SMCS Code: 1401-040

Tighten the battery retainers on all batteries at every 1000 hour interval.

Perform the following procedures at every 1000 hour interval. Check the following areas more often, as required:

- Clean the top of the batteries with a clean cloth.
- Keep the terminals clean and coat the terminals with petroleum jelly.
- Keep the terminal covers in place.

1. Open the battery access cover.
2. Clean the top of the batteries with a clean cloth. Keep the terminals clean and coated with petroleum jelly. Install the terminal covers after you coat the terminals.
3. Close the battery access cover.

i01324649

Battery Electrolyte Level - Check

SMCS Code: 1401-535-FLV

Maintenance free batteries are installed at the factory.

Table 19

MAINTENANCE INTERVALS FOR BATTERIES	
Battery	**Interval**
Conventional	100 Hours
Low Maintenance	250 Hours
Maintenance Free	Maintenance Free

Each battery cell should not require more than 30 cc (1 oz) of water weekly. This usage of water is typical with the proper charging rate and with a moderate climate.

When you are operating the machine in extreme temperatures, check the water in the battery cells weekly.

1. Open the battery access covers. The battery access covers are located on the left side of the machine outside the operator compartment.
2. Inspect the electrolyte level in each battery cell. (A maintenance free battery does not require inspection.) Maintain the electrolyte level to the bottom of the filler openings. Use distilled water. If distilled water is not available, use clean drinking water.
3. Close the battery access covers.

i01371301

Battery, Battery Cable or Battery Disconnect Switch - Replace

SMCS Code: 1401-510; 1402-510; 1411-510

WARNING

Batteries give off flammable fumes which can explode.

To avoid injury or death, do not strike a match, cause a spark, or smoke in the vicinity of a battery.

WARNING

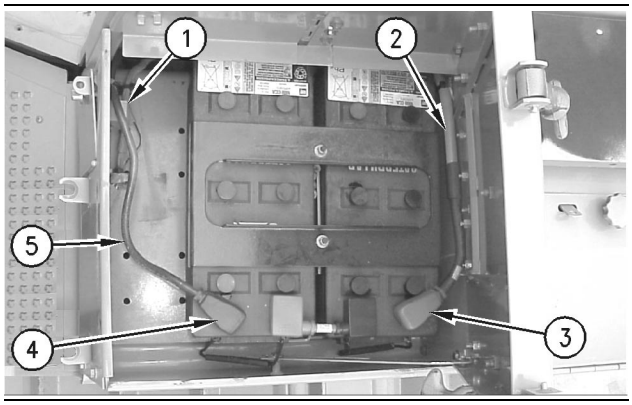
Personal injury can result from battery fumes or explosion.

Batteries give off flammable fumes that can explode. Electrolyte is an acid and can cause personal injury if it contacts the skin or eyes.

Prevent sparks near the batteries. Sparks could cause vapors to explode. Do not allow jumper cable ends to contact each other or the engine. Improper jumper cable connections can cause an explosion.

Always wear protective glasses when working with batteries.

1. Turn the engine start switch key to the OFF position. Turn all of the switches to the OFF position.
2. Turn the battery disconnect switch to the OFF position. Remove the key.
3. Make notes or mark the arrangement of the cables and of the batteries for correct installation.



g00738611

Illustration 160

Typical example of the battery box compartment

(1) Battery disconnect switch
(2) Positive cable
(3) Positive cable terminal
(4) Negative cable terminal
(5) Negative cable

Note: Typical negative cables and covers for negative terminals are black.

4. Always, disconnect the negative cable at the negative cable terminal first in order to prevent a spark. Verify that this negative cable is connected to the battery disconnect switch.

Note: Some positive cables and some covers for positive terminals are red for correct identification.

5. Disconnect the positive cable at the positive cable terminal.

6. Replace the disconnect switch, the battery cables, or the batteries, as required.

7. Connect the positive cable at the positive cable terminal.

8. Always, connect the negative cable at the negative cable terminal last.

9. Install the key and turn the battery disconnect switch to the ON position.

Recycle the Battery.

Always recycle a battery. Never discard a battery.

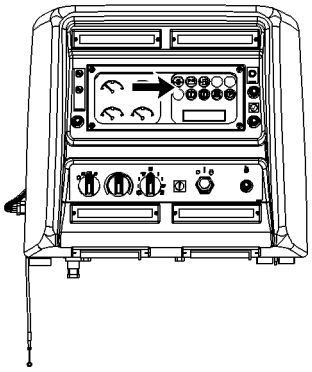
Always return used batteries to one of the following locations:

- A battery supplier
- An authorized battery collection facility
- Recycling facility

i00091365

Brakes, Indicators and Gauges - Test

SMCS Code: 4100-081; 7000-081; 7450-081



g00104090

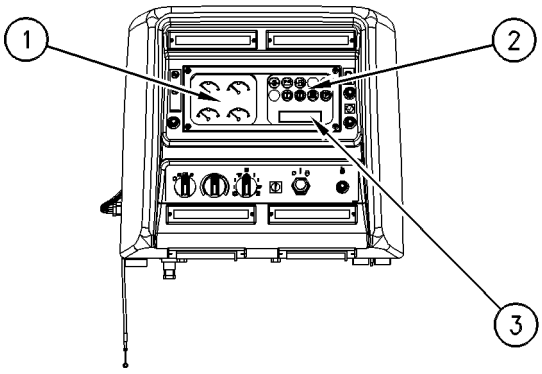
Illustration 161

Check the operation of the Caterpillar Monitoring System. Observe the self-test when you start the engine.

The system performs an automatic self-test when you turn the engine start switch to the ON position.

The self-test verifies that the monitoring panel and the display modules are operating properly.

The internal circuits, the indicators, and the gauges are automatically checked.



g00104091

Illustration 162

The operator must observe the indicators and the gauges in order to determine whether module (1), module (2), module (3), the indicators, and the gauges are operating properly. The self-test lasts for approximately three seconds.

During the self-test, all alert indicators flash.

The digital display shows the following readouts:

- All indicators of units (Deg C, kPa, rpm, and liters)
- “X10” readout
- Symbol for the hour meter
- “8.8.8.X.8.8” readout

The pointers in the gauges point upward. Then, the pointers point to the left. Then, the pointers point to the right. Then, the pointers point to the final positions.

- The gear/direction readout shows “* *”.
- The speed readout shows “188”, “MPH”, and “km/h”.
- The action light stays illuminated.
- The action alarm sounds once.

The monitoring panel is then in the normal operating mode.

If the above tests are not correctly completed, the system will not function in the normal operating mode. Consult your Caterpillar dealer for an electrical system check. Any repairs must be made before you start the engine.

Turn on all of the machine lights. Check for proper operation. Sound the forward horn.

Move the machine forward and test the service brakes. See Operation and Maintenance Manual, “Braking System - Test”.

Stop the engine.

Make any necessary repairs before you operate the machine.

i00906497

Braking System - Test

SMCS Code: 4100-081; 4267-081

⚠ WARNING

If the machine moves during the test, reduce the engine speed immediately, and engage the parking brake.

If the machine moved while testing the brakes, consult your Caterpillar dealer for brake inspection and repair. Damaged brakes must be repaired before returning the machine to operation.

Make sure that the area around the machine is clear of personnel and clear of obstacles.

Test the brakes on a dry, level surface.

Fasten the seat belt before you test the brakes.

The following test is used to determine whether the service brake is functional. This test is not intended to determine the maximum brake holding effort. The brake holding effort of this machine will be different from the brake holding effort of other machines because of the variations in the engine setting, in the power train efficiency, and in the brake holding ability.

Compare the engine speed at the beginning of machine movement to the engine speed of a prior test. This will be an indication of the amount of system deterioration.

1. Start the engine.
2. Raise all attachments.
3. Depress the brake pedal.
4. Select the mode of manual shift.
5. Release the parking brake.
6. While the brake pedal is depressed, move the directional control to the NEUTRAL position.
7. Select the THIRD SPEED position. The control panel will indicate “3N”.

Note: When you test the brake system, make sure that the transmission is in the THIRD SPEED position. You can depress the button in order to read the speed on the digital display window.

8. Select the FORWARD position. The control panel will indicate “3F”.
9. Gradually increase the engine speed to full load speed. The machine should not move.
10. Move the directional control to the NEUTRAL position.
11. Move the throttle switch to LOW IDLE. Turn on the parking brake switch. Lower all attachments to the ground. Apply a slight down pressure. Stop the engine.

NOTICE
If the machine moved while testing the brakes, contact your Caterpillar dealer. Have the dealer inspect and, if necessary, repair the service brake before returning the machine to operation.

i01400166

Cab Filter (Fresh Air) - Clean/Inspect/Replace (If Equipped)

SMCS Code: 7342-070-FI; 7342-510-FI

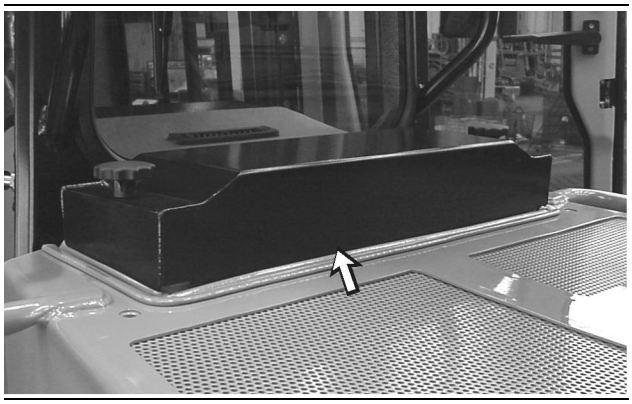


Illustration 163 g00737776

1. Remove the filter cover and the filter element. The filter cover is in front of the cab.
2. The filter element can be cleaned by using pressure air. Use a maximum air pressure of 205 kPa (30 psi). Direct the air from the clean side to the dirty side.
3. Look through the filter toward a bright light. Inspect the element for damage. Inspect the gaskets for damage. Replace damaged filters.
4. Install the filter element.

Note: Clean the filters more often in dusty conditions.

i01400226

Cab Filter (Recirculation) - Clean/Inspect/Replace (If Equipped)

SMCS Code: 7342-040; 7342-070; 7342-510

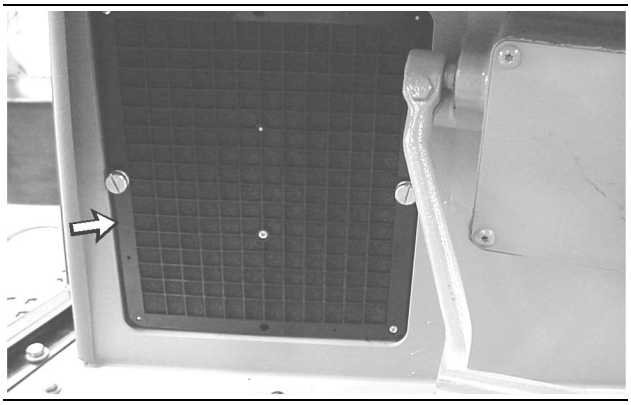


Illustration 164 g00737786

1. Remove the filter element that is positioned in the operator's compartment.
2. The filter element can be cleaned by using pressure air. Use a maximum air pressure of 205 kPa (30 psi). Direct the air from the clean side to the dirty side.
3. Look through the filter toward a bright light. Inspect the element for damage. Inspect the gaskets for damage. Replace damaged filters.
4. Install the filter element.

Note: Clean the filters more often in dusty conditions.

i00753322

Circuit Breakers - Reset

SMCS Code: 1417-529; 1420-529

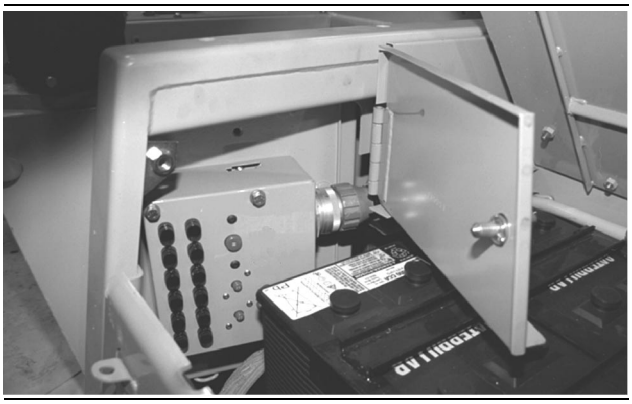


Illustration 165 g00339673

The fuse panel is in the battery compartment on the left side of the machine.

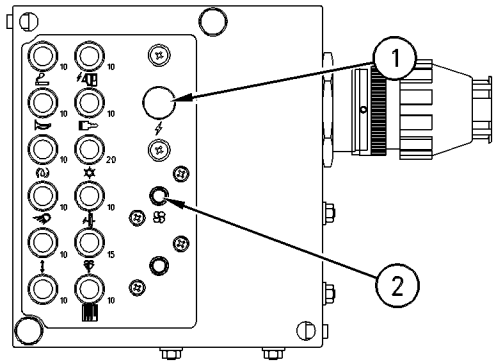


Illustration 166 g00103722

Circuit Breaker/Reset – Push in the button in order to reset the circuit breaker. If the electrical system is working properly, the button will remain depressed. If the button does not remain depressed, check the appropriate electrical circuit. Repair the electrical circuit, if necessary.

(1) Alternator – 80 Amp

(2) Heater and Air Blower Motor Reset – 20 Amp

i01399691

Cooling System Extended Life Coolant - Change

SMCS Code: 1350-044; 1395-044

For information about adding an extender to your cooling system, see the Topic “Cooling System Extended Life Coolant Extender - Add” in this manual or consult your Caterpillar dealer.

NOTICE
Make sure you read and understand the information in the topics Safety and Cooling System Specifications for all information pertaining to water, antifreeze and supplemental coolant additive requirements before you proceed with maintenance of the cooling system.

To Drain the Cooling System

The filler cap is located inside the access door in the top, left side of the radiator guard.

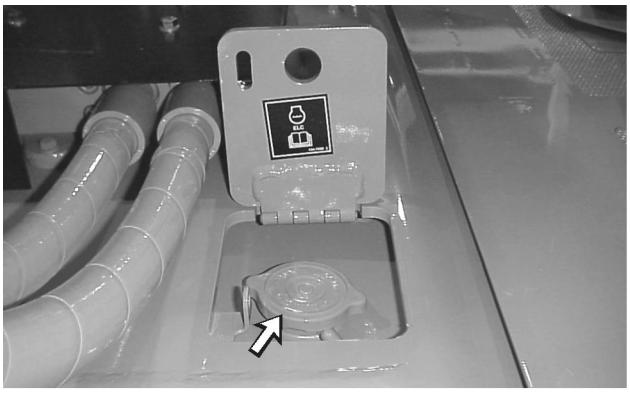


Illustration 167 g00581795

1. Slowly loosen the filler cap in order to relieve system pressure. Remove the filler cap.

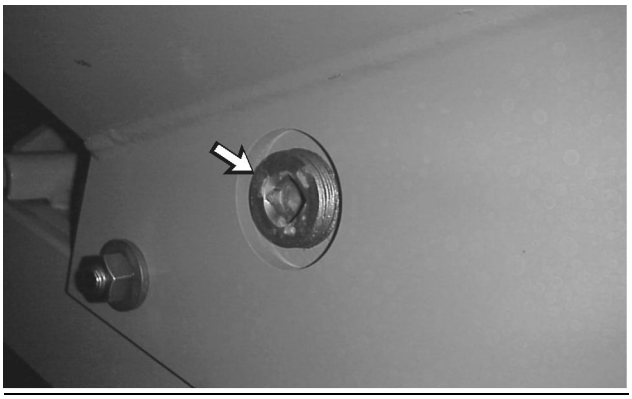


Illustration 168 g00737499

2. Remove the pipe plug. The pipe plug is located in the front, bottom guard.

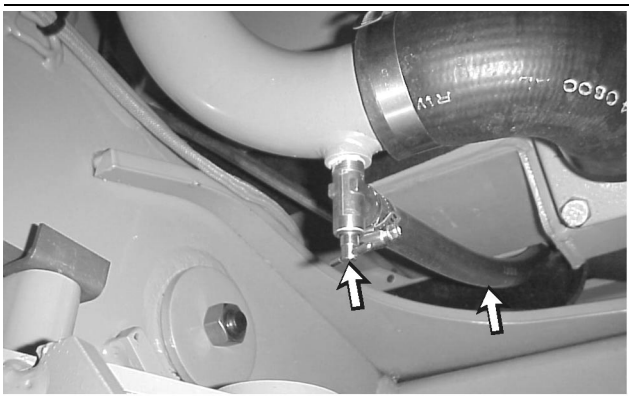


Illustration 169 g00737503

3. Place the drain hose through the pipe plug opening.

4. Open the drain valve. Allow the coolant to drain into a suitable container.

5. Flush the system with water. Flush the system until the draining water is clear.

Note: If the cooling system is already using ELC, cleaning agents are not required to be used at the specified coolant change interval. Cleaning agents are only required if the system has been contaminated by the addition of some other type of coolant or by cooling system damage. Clean water is the only cleaning agent that is required when ELC is drained from the cooling system.

Note: If you change to an ELC from another type of coolant, use a Caterpillar cleaning agent to flush the cooling system. After you drain the cooling system, thoroughly flush the cooling system with clean water. **All of the cleaning agent must be removed from the cooling system.** Refer to the Topic “Extended Life Coolant (ELC)” in this manual.

6. Close the drain valve and install the plug.

7. Add the ELC solution. See the following topics in this publication:

- Cooling System Specifications
- Refill Capacities

Note: Caterpillar antifreeze contains additive. If you are using Caterpillar antifreeze, do not add the supplemental coolant additive at this time. Also, do not change the supplemental coolant additive element at this time.

8. Start the engine. Run the engine without the filler cap until the thermostat opens and the coolant level stabilizes.

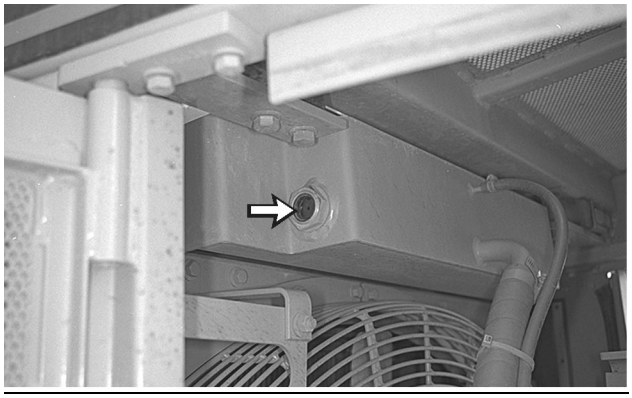


Illustration 170 g00103926

9. Observe the sight glass in order to verify the level of the coolant. If the coolant completely covers the sight glass, the coolant level is okay. If the coolant level is low in the sight glass, the coolant level is low.

10. If the gasket is damaged, replace the filler cap. Install the filler cap.

11. Stop the engine.

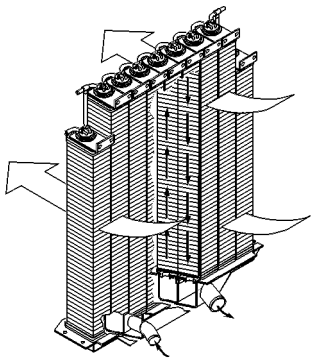


Illustration 171 g00533931

12. Clean the radiator cores with compressed air. You may need to use water in order to remove debris.

i01380673

Cooling System Extended Life Coolant Extender - Add

SMCS Code: 1350; 1352-544-NL; 1395-544-NL

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Table 20

Amount of Caterpillar ELC Extender by Cooling System Capacity	
Cooling System Capacity(1)	Recommended Amount of Caterpillar Extender
65 to 83 L (17 to 22 US gal)	1.60 L (54 oz)

(1) The cooling system capacity for the D7R is 75 L (19.8 US gal).

When a Caterpillar Extended Life Coolant (ELC) is used, an extender must be added to the cooling system. See the Operation and Maintenance Manual, “Maintenance Interval Schedule” for the proper service interval. The amount of extender is determined by the cooling system capacity.

For additional information about adding an extender, see Operation and Maintenance Manual, “Coolant Recommendations” or consult your Caterpillar dealer.

Extended Life Coolant (ELC) Additive

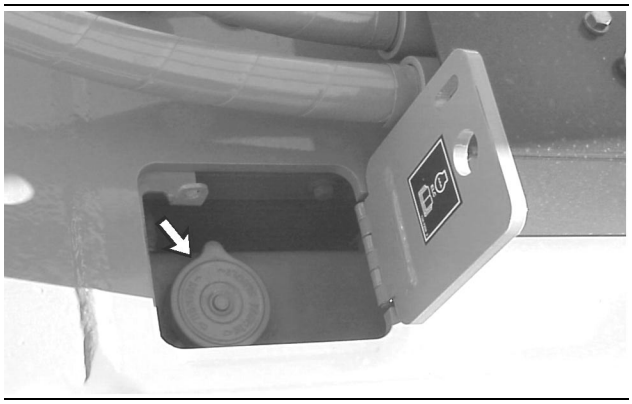


Illustration 172 g00588487

1. The filler cap is located inside the access door on the top, left side of the radiator guard. Slowly loosen the filler cap in order to relieve the pressure. Remove the cap.

2. Add ELC. Drain some coolant from the radiator into a suitable container in order to allow space for the extra ELC.

Note: Always discard drained fluids according to local regulations.

3. Start the engine. Run the engine without the filler cap until the thermostat opens and the coolant level stabilizes. Check for leaks.

4. Check the coolant level. If necessary, add premixed coolant in order to correct the coolant level. Maintain the coolant level between area (2) and area (3) of the filler tube. Adding coolant above this area of the filler tube will cause the coolant to overflow the cooling system.

5. Inspect the filler cap gasket. Replace the filler cap if the gasket is damaged.

6. Install the filler cap.

i00072607

Cooling System Level - Check

SMCS Code: 1353-535-FLV; 1395-535-FLV

WARNING

At operating temperature, the engine coolant is hot and under pressure.

Steam can cause personal injury.

Check the coolant level only after the engine has been stopped and the fill cap is cool enough to touch with your bare hand.

Remove the fill cap slowly to relieve pressure.

Cooling system conditioner contains alkali. Avoid contact with the skin and eyes to prevent personal injury.

This machine’s radiator has a surge tank. There is no top tank in this cooling system. The surge tank has a filler cap and a sight glass. It is not necessary to remove the filler cap in order to check the coolant level. The sight glass is inside the engine compartment that is on the front left side of the machine. The filler cap is beneath the access door that is on the top left side of the radiator guard.

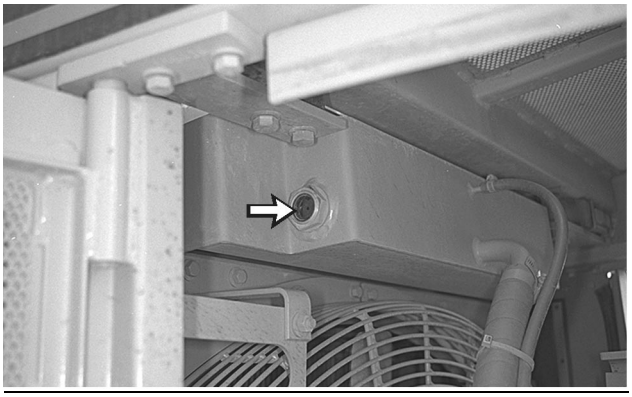


Illustration 173 g00103926

1. Observe the sight glass in order to verify the level of the coolant. If the coolant completely covers the sight glass, the coolant level is okay. If the coolant level is visible in the sight glass, the coolant is low.

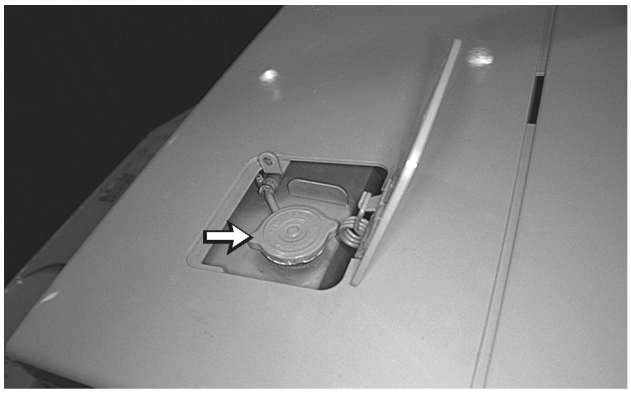


Illustration 174 g00101147

2. If it is necessary to add coolant, remove the radiator cap slowly in order to relieve the pressure.

3. Fill the cooling system to the bottom of the filler tube. Adding coolant above the bottom of the filler tube will cause the coolant to overflow the cooling system.

4. Maintain the coolant level between the top of the sight glass and the bottom of the filler tube. If you need to add coolant daily, check the cooling system for leaks.

5. Inspect the radiator cap and the radiator cap seal for debris, for foreign material, or for damage. Clean the radiator cap with a clean cloth. Replace the radiator cap if the radiator cap is damaged.

6. Install the radiator cap.

7. Inspect the radiator core for debris. Clean the radiator core, if necessary.

Use compressed air, high pressure water, or steam to remove dust and debris from the radiator core. However, the use of compressed air is preferred.

i01399200

Cooling System Water Temperature Regulator - Replace

SMCS Code: 1355-510

Replace the thermostat on a regular basis in order to reduce the chance of unscheduled downtime and of problems with the cooling system.

A new thermostat should be installed after the cooling system has been cleaned. Install the thermostat while the cooling system is completely drained or while the cooling system coolant is drained to a level that is below the thermostat housing.

NOTICE
Failure to replace the engine's thermostat on a regularly scheduled basis could cause severe engine damage.

Note: If you are only installing a new thermostat, drain the cooling system coolant to a level that is below the thermostat housing.

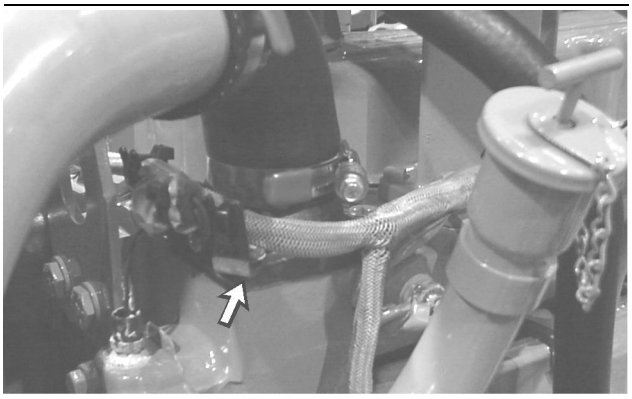


Illustration 175 g00737321

1. Loosen the hose clamp and remove the hose from the elbow. Disconnect the hose assembly from the thermostat housing assembly.

2. Remove the bolts from the elbow. Remove the elbow and the thermostat housing assembly.

3. Remove the gasket, the thermostat, and the seal from the thermostat housing.

NOTICE
A used thermostat can be installed if the thermostat conforms to test specifications, and the thermostat is not damaged. Do not install a used thermostat that has excessive buildup or deposits.

NOTICE
Since Caterpillar engines incorporate a shunt design cooling system, it is mandatory to always operate the engine with a thermostat.

Depending on load, failure to operate with a thermostat could result in either an overheating or an overcooling condition.

NOTICE
If the thermostat is installed incorrectly, it will cause the engine to overheat.

4. Install a new seal in the thermostat housing. Install a new thermostat and a new gasket. Install the thermostat housing on the engine cylinder head.

5. Install the elbow and the hose. Tighten the hose clamp.

i00079309

Cutting Edges and End Bits - Inspect/Replace

SMCS Code: 6801-040; 6801-510; 6804-040; 6804-510

Illustration 176 g00104458

1. Raise the bulldozer blade and block up the bulldozer blade. When you remove the cutting edges and the end bits, maintain the bulldozer blade at a minimum height.

2. Remove the bolts. Then remove the cutting edge and the end bits.

3. Thoroughly clean all contact surfaces.

4. Inspect the opposite side of the cutting edge. If the opposite side of the cutting edge is not worn, turn the opposite side of the cutting edge outward and install the cutting edge.

5. If both sides of the cutting edge are worn, install a new cutting edge section.

6. Repeat Step 4 and Step 5 for the end bits.

7. Install all bolts and tighten the bolts to the specified torque. Refer to Operation and Maintenance Manual, “Torques for Ground Engaging Tools”.

8. Strike the bolt heads with a hammer that weighs 1.4 kg (3 lb). Tighten the bolts to the specified torque again.

9. Raise the bulldozer blade and remove the blocking. Lower the bulldozer blade to the ground.

i01364960

Engine Air Filter Primary Element - Clean/Replace

SMCS Code: 1051-070; 1051-510-PY; 1054-070-PY; 1054-510-PY

NOTICE
Service the engine air filters with the engine stopped. Engine damage could result.

NOTICE
Always leave the secondary filter element in place while you clean the primary element, or while you clean the air cleaner housing.

Illustration 177 g00104396

1. Open the access door (if equipped).

Illustration 178 g00103726

2. Remove the air cleaner cover.

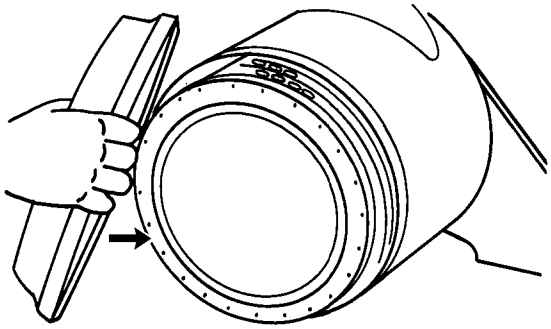


Illustration 179 g00100510

3. Remove the primary filter element from the air cleaner housing.

4. Mark the primary filter element in order to show that the primary filter element has been serviced. The secondary filter element should be replaced when the primary filter element is serviced for the third time.

Reference: Refer to Operation and Maintenance Manual, “Engine Air Filter Secondary Element - Replace”.

5. If the primary filter element has been cleaned six times, replace the primary filter element. Also replace the primary element if the primary element has been used for one year. Proceed to Step 9.

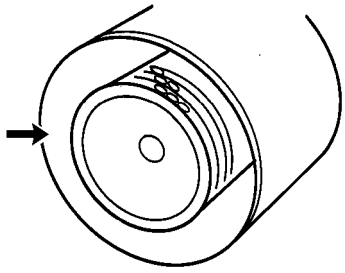


Illustration 180 g00039201

6. Clean the inside of the air cleaner housing.

7. If the primary filter element has not been cleaned six times, inspect the primary element. Inspect the filter element for holes and for tears by looking through the filter element. Look toward a bright light. Inspect the element for damaged gaskets or for dented metal parts. Replace damaged filters. Always crush damaged filter elements. Properly discard the filter elements. If you replace the primary filter element, proceed to Step 9.

NOTICE

Do not clean the filter elements by bumping or tapping the filter elements. Do not use filter elements with damaged pleats, gaskets, or seals. Do not wash the filter elements.

8. If the primary filter element is not damaged and the element has not been previously cleaned six times, clean the element. The filter element can be cleaned by using pressure air. Use a maximum air pressure of 205 kPa (30 psi). Direct the air from the clean side to the dirty side.

9. Install a clean primary filter element. Write the date of service on the element.

10. Clean the cover and install the cover.

11. Close the access door (if equipped).

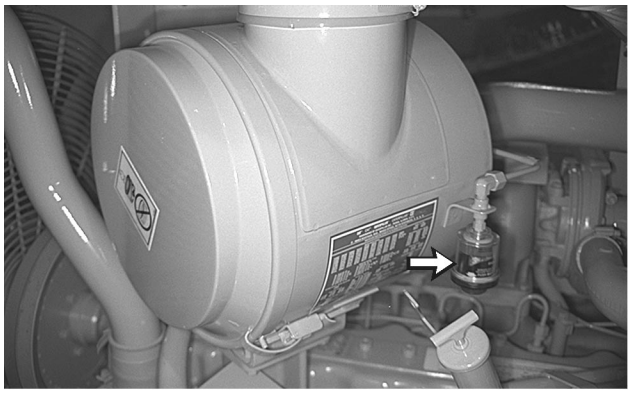


Illustration 181 g00103729

12. Reset the filter element indicator.

Start the engine. If the yellow piston in the filter element indicator moves into the red zone, install a new primary filter element. Also if the exhaust smoke is black, install a new primary filter element.

i00078414

Engine Air Filter Secondary Element - Replace

SMCS Code: 1051-510-SE; 1054-510-SE

NOTICE
Always replace the secondary element. Do not attempt to reuse it by cleaning. Engine damage could result.

Note: Replace the secondary filter element when you service the primary element for the third time. If a clean primary element has been installed and the filter element indicator still enters the red zone, replace the secondary filter element. Also if the exhaust smoke remains black and a clean primary filter element has been installed, replace the secondary filter element.

Illustration 182 g00104397

1. Open the access cover (if equipped).

2. Remove the housing cover and the primary element.

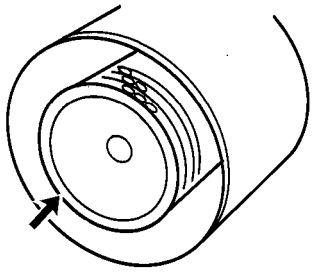


Illustration 183 g00039214

3. Remove the secondary element.

4. Cover the air inlet opening. Clean the inside of the air cleaner housing.

5. Inspect the gasket between the air inlet and the housing. If the gasket is damaged, replace the gasket.

6. Uncover the air inlet opening. Install a new secondary element.

7. Install the primary element and the air cleaner housing cover.

8. Close the access cover (if equipped).

i00072811

Engine Air Precleaner - Clean

SMCS Code: 1050-070

Illustration 184 g00103735

1. Inspect the air inlet screen for dirt and for trash.
2. Remove the screen. Clean the screen if the screen is dirty.
3. Inspect the precleaner tube for dirt and for dust.
4. Clean the precleaner tube with pressure air if the precleaner tube is dirty.

NOTICE
Service the air cleaner only with the engine stopped. Engine damage could result.

Run the engine at high idle. If the yellow piston in the filter element indicator enters the red zone, service the air cleaner. Stop the engine.

i00072815

Engine Crankcase Breather - Clean

SMCS Code: 1317-070

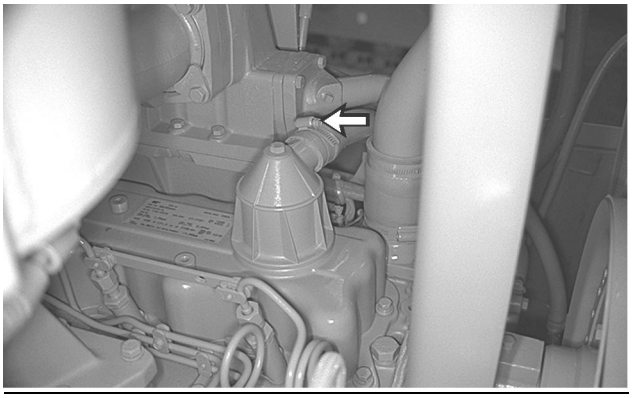


Illustration 185 g00103737

1. Loosen the breather outlet hose clamps. Remove the hose from the breather cover.
2. Loosen the breather inlet hose clamp. Remove the engine crankcase breather.
3. Check the condition of the cover seal. Replace the cover seal if the cover seal is damaged.
4. Wash the breather element and the breather element cover assembly in a clean nonflammable solvent.
5. Shake the breather element until the breather element is dry. You may also use pressure air to dry the breather element.
6. Check the condition of the hose. Replace the hose if the hose is damaged.
7. Install the breather element cover assembly.
8. Install the hose and the breather outlet hose clamps.
9. Install the access cover.

i01365509

Engine Oil Level - Check

SMCS Code: 1302-535-FLV; 1326-535-FLV

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

NOTICE
Do not under fill or overfill engine crankcase with oil. Either condition can cause engine damage.

1. The level gauge relies on gravity. The machine must be on a level surface for an accurate check.

2. Open the access cover that is on the left side of the machine.

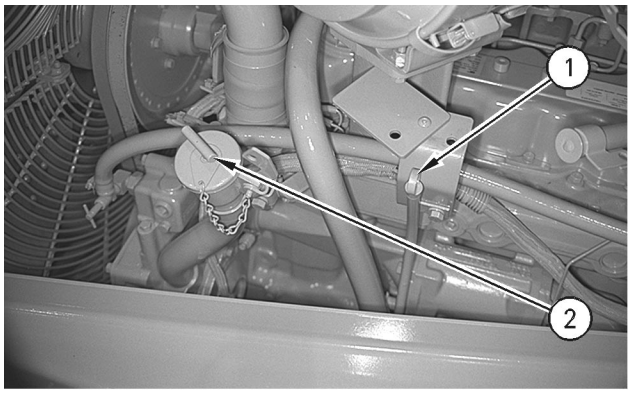


Illustration 186 g00103739

3. Check the “SAFE OPERATING RANGE” side of the dipstick (1) while the engine is running and the oil is at operating temperature. Maintain the oil level in the crosshatch on the dipstick.

   Check the “SAFE STARTING RANGE” side of dipstick (1) while the engine is stopped. The oil should be cold. Maintain the oil level in the crosshatch on the dipstick.

Note: When you operate the machine on severe slopes, the oil level in the engine crankcase must be at the top end of the “SAFE STARTING RANGE” side of the dipstick.

4. Remove oil filler cap (2). If necessary, add oil.

5. Clean the oil filler cap and install the oil filler cap.

6. Close the access cover.

i01400018

Engine Oil and Filter - Change

SMCS Code: 1308; 1318-510

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

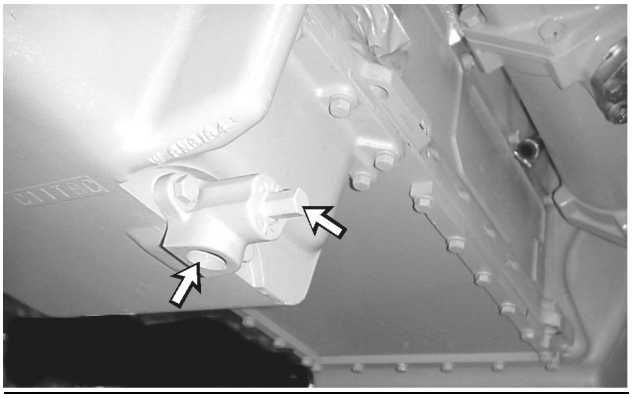


Illustration 187 g00737704

1. Remove the plug adapter from the drain valve, if equipped.

2. Install a 19.05 mm (0.750 inch) pipe into the drain valve. The pipe requires a 3/4 - 14 NPTF pipe thread.

3. Open the drain valve. Allow the oil to drain into a suitable container. A drain hose may be attached to the pipe to aid in draining.

4. When the oil has completed draining from the crankcase, close the drain valve. Remove the pipe. Install the plug adapter.

5. Remove the engine oil filter element and discard the engine oil filter element properly. Make sure that all of the old filter seal is removed from the filter base.

6. Apply a thin coat of oil to the new filter seals. Install the new engine oil filter elements by hand. When the gaskets contact the filter base, tighten the filter elements by an additional turn of 270 degrees. Rotation index marks are on the new filter elements. These rotation index marks are spaced at 90 degree intervals. Use these rotation index marks as a guide for proper tightening.

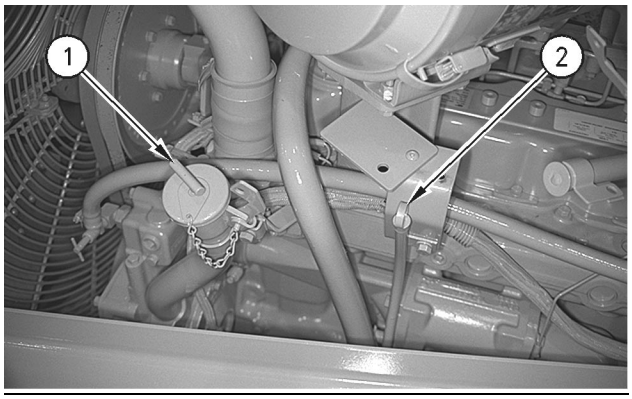


Illustration 188 g00103751

7. Remove the oil filler cap (1). Fill the crankcase with new oil. See Operation and Maintenance Manual, “Refill Capacities”. Clean the oil filler cap and install the oil filler cap.

8. Always measure the oil level with the dipstick in order to ensure that the correct amount of oil was added.

9. On the dipstick, maintain the oil level within the operating range.

i01177320

Engine Valve Lash - Check

SMCS Code: 1102; 1209-535

In order to perform the procedure for the valve lash check and for the engine valve lash adjustment, refer to Systems Operation/Testing and Adjusting, SENR5594, “Air Inlet and Exhaust System”.

Note: Make sure that qualified service personnel check the injector fuel timing. If an adjustment is necessary, make sure that qualified service personnel adjust the injector fuel timing. Special tools and training are required.

Note: The correct fuel timing specification is shown on the Engine Information Plate. Fuel timing specifications will be different with each engine application and with each power rating.

Consult your Caterpillar dealer for the complete adjustment procedure.

i00711565

Engine Valve Rotators - Inspect

SMCS Code: 1109-040

⚠ WARNING

When inspecting the valve rotators, protective glasses or face shield and protective clothing must be worn, to prevent being burned by hot oil or spray.

1. Start the engine. Run the engine at low idle.

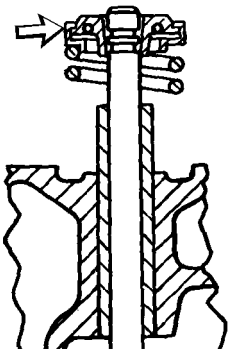


Illustration 189 g00038585

2. Watch the top surface of each valve rotator. Whenever an inlet valve closes or an exhaust valve closes, each valve rotator should turn.

3. If a valve rotator fails to rotate, consult your Caterpillar dealer for service.

Note: Caterpillar recommends replacing valve rotators that are operating improperly. An improperly operating valve rotator will shorten valve life because of accelerated wear on the valves.

Note: If a damaged valve rotator is not replaced, some valve face guttering could result. Metal particles from the valve could fall into the cylinder. This could cause damage to the piston head and to the cylinder head.

i00080128

Equalizer Bar Pins - Inspect

SMCS Code: 7206-040-PN; 7207-040-PN

Illustration 190 g00104571

Check the equalizer bar pins for looseness and for unusual wear.

If unusual wear is evident, see the Service Manual or consult your Caterpillar dealer for an inspection and for repair instructions.

i01398945

Equalizer Bar Pins - Lubricate

SMCS Code: 7206-086-PN; 7207-086-PN

NOTICE
Apply lubricant to the fittings with a hand operated grease gun only. Use of pressure operated lubricating equipment damages the seals.

The equalizer bar has two vent passages in the outside positions. The equalizer bar has one grease fitting in the center.

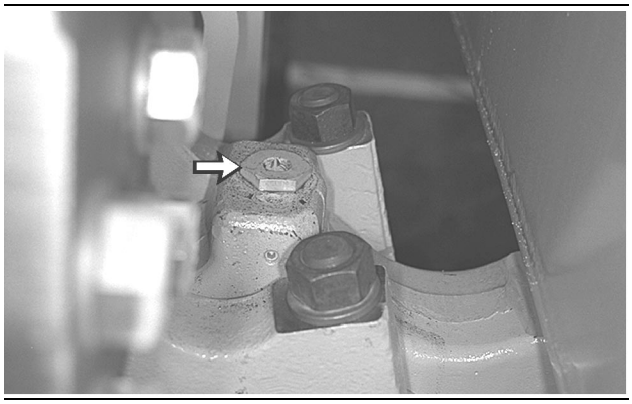


Illustration 191 g00104584

Remove the large plug in order to provide access to the grease fitting. Apply Caterpillar Gear Oil (GO). Apply the gear oil through the fitting until gear oil squirts out of one vent passage or out of both vent passages. Use a hand-operated grease gun to apply the grease.

Note: If it is difficult to use the gear oil due to current maintenance practices, you can use Caterpillar Multipurpose Grease (MPGM). Because the gear oil has greater load carrying capacity and better lubricating characteristics, the gear oil is used at the factory. The combination of gear oil and MPGM is not harmful to the machine.

i00080065

Ether Starting Aid Cylinder - Replace

SMCS Code: 1456-510-CD

Illustration 192 g00104559

1. Open the left engine access door. The ether starting aid is located on the left front of the engine.
2. Loosen the cylinder retaining clamp. Unscrew the empty ether starting aid cylinder and remove the empty ether starting aid cylinder.
3. Remove the used gasket. Install the new gasket that is provided with each new ether starting aid cylinder.
4. Install the new ether starting aid cylinder. Tighten the ether starting aid cylinder by hand. Tighten the cylinder retaining clamp securely.
5. Close the engine access door.

i01262397

Fan Drive Pulley and Idler - Lubricate

SMCS Code: 1359-086

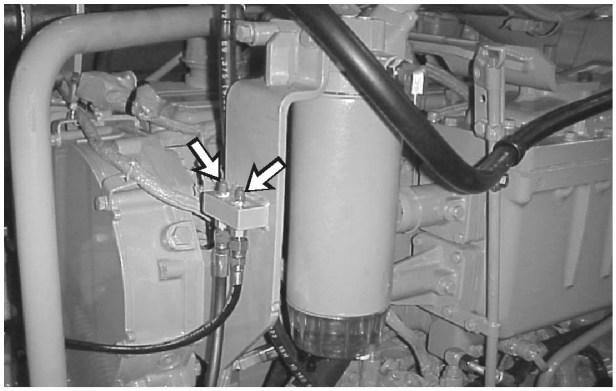


Illustration 193 g00671267

Lubricate two fittings with Bearing Lubricant Special Purpose Grease (SPG). The fittings are for the fan drive pulley and for the idler (belt tightener).

i00803315

Final Drive Oil - Change

SMCS Code: 4050-535-FLV

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the machine. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide”, for tools and supplies suitable to collect and contain fluids in Caterpillar machines.

Dispose of all fluids according to local regulations and mandates.

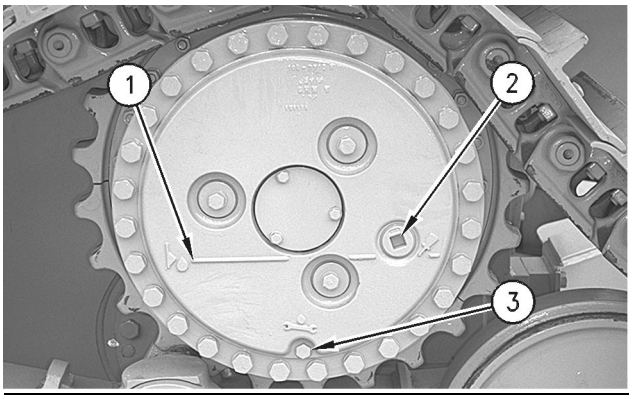


Illustration 194 g00100627

1. Position one final drive so that oil level mark (1) is horizontal. The drain plug (3) will point downward.
2. Remove drain plug (3). Allow the oil to drain into a suitable container.
3. Inspect the drain plug seal. Replace the drain plug seal if the drain plug seal is damaged.
4. Clean the drain plug and install the drain plug.
5. Remove oil filler plug (2).
6. Fill the final drive with oil to the bottom of the filler plug opening. See Operation and Maintenance Manual, “Refill Capacities”.
7. Inspect the condition of the seal of the filler plug. Replace the plug seal if the plug seal is damaged.
8. Repeat Step 1 to Step 7 in order to change the oil in the other final drive.

i01023410

Final Drive Oil Level - Check

SMCS Code: 4050-535-FLV

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

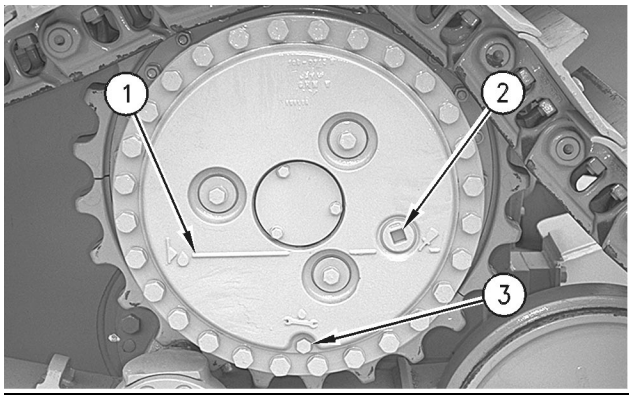


Illustration 195 g00100625

1. Position one final drive so that oil level mark (1) is horizontal and drain plug (3) is at the bottom.
2. Remove oil filler plug (2).
3. The oil level should be at the bottom of the filler plug opening. Add oil, if necessary.

   See the Table in the article “Lubricant Viscosities” for the type of oil.
4. Install oil filler plug (2).
5. Repeat Step 1 to Step 4 in order to check the oil level in the other final drive.

i01256760

Front Idler Position - Check

SMCS Code: 4159

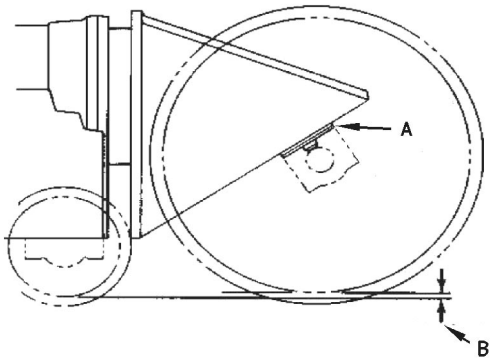


Illustration 196 g00669323

(A) Adjusting shims
(B) Dimension between the height of the front idler tread and the height of the roller tread

The height of the front idler tread should always be higher than the height of the roller tread. The dimension (B) is set approximately to 9.0 mm (.35 inch) at the factory. Dimension (B) decreases as the undercarriage wears. If a rebuilt idler or a new idler is installed with track rollers that are worn, dimension (B) decreases.

Adjustment of the front idler to the correct height can improve the ride of the tractor and the performance of the dozer. Use the following procedures to determine the best operating position.

If the machine is operated on FIRM UNDERFOOT conditions and excess vibration occurs, shims can be removed in order to raise the front idler.

If the machine is operated on SOFT UNDERFOOT conditions and dozing performance is poor, shims can be installed in order to lower the front idler. Lowering the front idler can improve dozing performance. If ground rippling by the dozer or excess vibration occur in soft material, shims can be removed in order to raise the front idler.

Consult your Caterpillar dealer for detailed information about checking the idler and about adjustments to the idler.

i00072933

Fuel System - Prime

SMCS Code: 1258

If the engine does not start, air may be trapped in the fuel lines to the engine. Use the following procedure in order to purge air from the fuel lines.

Fuel Priming Pump (If Equipped)

The fuel priming pump is located in the engine compartment on the right side of the machine.

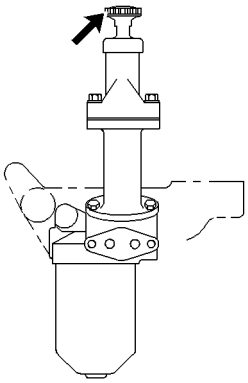


Illustration 197 g00103758

1. Unlock the priming pump plunger. Operate the plunger until you feel resistance.

2. Push in the plunger. Hand tighten the plunger.

3. Start the engine. If the engine does not start, or if the engine continues to misfire or smoke, additional priming is necessary.

4. Run the engine at the LOW IDLE position until the engine runs smoothly.

i01398984

Fuel System Primary Filter/Water Separator - Drain

SMCS Code: 1263-543; 1263

⚠ WARNING

Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire. To help prevent possible injury, turn the start switch off when changing fuel filters or water separator elements. Clean up fuel spills immediately.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

NOTICE

Do not allow dirt to enter the fuel system. Thoroughly clean the area around a fuel system component that will be disconnected. Fit a suitable cover over disconnected fuel system component.

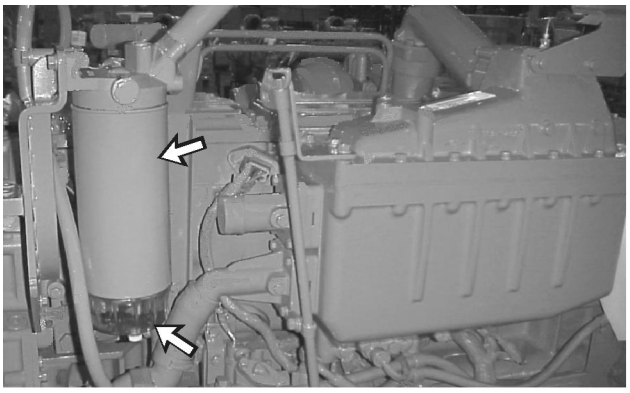


Illustration 198 g00677554

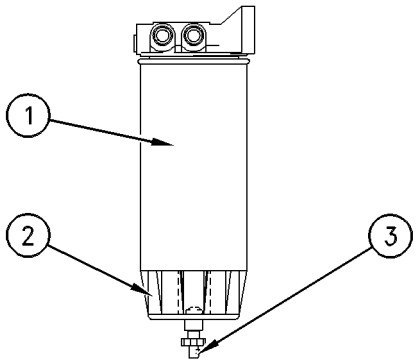


Illustration 199 g00104007

(1) Element
(2) Bowl
(3) Drain

Bowl (2) should be monitored daily for signs of water. If water is present, drain the water from the bowl.

1. Open drain (3). The drain is a self-ventilated drain. Catch the draining water in a suitable container. Dispose of the water properly.

2. Close drain (3).

NOTICE

The water separator is under suction during normal engine operation. Ensure that the drain valve is tightened securely to help prevent air from entering the fuel system.

i01399154

Fuel System Primary Filter - Replace

SMCS Code: 1260-510-PY; 1261

WARNING

Personal injury can result from air pressure.

Personal injury can result without following proper procedure. When using pressure air, wear a protective face shield and protective clothing.

Maximum air pressure at the nozzle must be less than 205 kPa (30 psi) for cleaning purposes.

WARNING

Personal injury or death can result from engine overspeed.

If the engine overspeeds, it can cause injury or parts damage.

Be prepared to stop the engine by closing the air off to the air inlets or by manually pushing downward on the governor shutdown rod.

WARNING

Personal injury or death can result from a fire.

Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire.

Clean up all leaked or spilled fuel. Do not smoke while working on the fuel system.

Turn the disconnect switch OFF or disconnect the battery when changing fuel filters.

NOTICE

Do not fill fuel filter with fuel before installing the fuel filter. Contaminated fuel causes accelerated wear to fuel system parts.

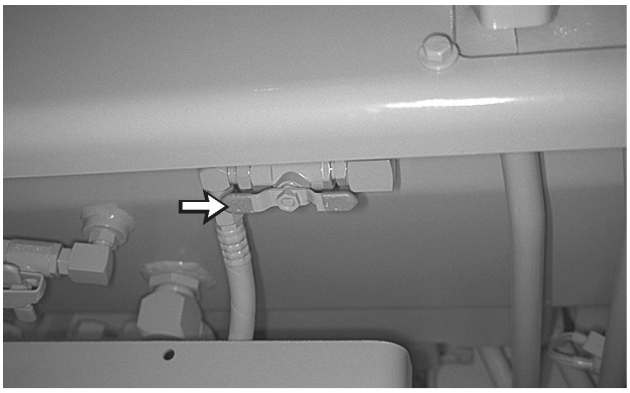


Illustration 200 g00103874

1. Open the access door (if equipped) at the rear of the machine. Turn the red handle of the fuel shutoff valve in order to shut off the fuel supply.
2. Open the access cover for the engine compartment. The access cover is located on the right side of the machine.

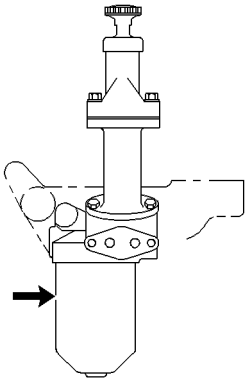


Illustration 201 g00103875

3. Remove the filter with a strap wrench.
4. Wash the filter mounting base in clean, nonflammable solvent. Make sure that all of the old seal is removed.
5. Coat the seal of the new filter element with clean diesel fuel.
6. Install the new filter element by hand. When the seal contacts the base, tighten the filter element for an additional 3/4 turn.

   Rotation index marks are positioned on the filter elements at 90 degree intervals. Use these rotation index marks as a guide when you tighten the filter.
7. Open the fuel shutoff valve. Close the access door (if equipped).

8. Prime the fuel system.

i00073327

Fuel System Secondary Filter - Replace

SMCS Code: 1261-510-SE

WARNING

Personal injury can result from air pressure.

Personal injury can result without following proper procedure. When using pressure air, wear a protective face shield and protective clothing.

Maximum air pressure at the nozzle must be less than 205 kPa (30 psi) for cleaning purposes.

WARNING

Personal injury can result when using cleaner solvents.

To help prevent personal injury, follow the instructions and warnings on the cleaner solvent container before using.

WARNING

Personal injury or death can result from a fire.

Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire.

Clean up all leaked or spilled fuel. Do not smoke while working on the fuel system.

Turn the disconnect switch OFF or disconnect the battery when changing fuel filters.

NOTICE

Do not fill fuel filters with fuel before installing them. Contaminated fuel will cause accelerated wear to fuel system parts.

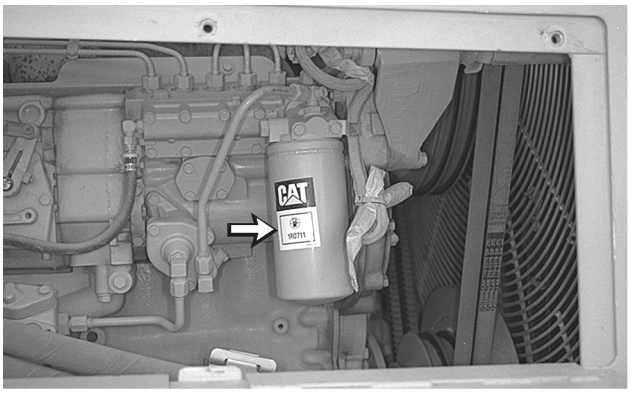


Illustration 202 g00103879

Before you replace the secondary fuel filter element, replace the primary fuel filter element.

The secondary fuel filter is behind the access door on the right side of the machine.

1. Shut off the fuel supply. The fuel shutoff valve is under the fuel tank on the rear of the machine.

2. Remove the filter element. Discard the filter element properly.

3. Clean the filter housing base. Make sure that all of the old seal is removed.

4. Coat the seal of the new filter element with clean diesel fuel.

5. Install the new filter element by hand. When the seal contacts the base, tighten the filter element for an additional 3/4 turn.

Rotation index marks are positioned on the filter element at 90 degree intervals. Use these rotation index marks as a guide when you tighten the filter.

6. Open the fuel shutoff valve.

7. Prime the fuel system.

i01256353

Fuel Tank Cap Filter and Strainer - Replace/Clean

SMCS Code: 1273-070-STR; 1273-070-Z2

Illustration 203 g00669021

The fuel cap is located on the rear of the machine. The cap is on the left side of the machine.

Only vented fuel caps have filters. Machines without the fast fill fuel arrangement require a vented fuel cap.

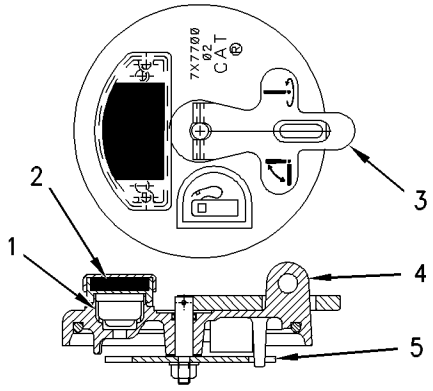


Illustration 204 g00668917

1. Lift lever (3) in order to remove the fuel tank filler cap. Turn the lever counterclockwise until the lever stops. Lift the cap straight up in order to remove the cap.

2. In order to remove the filter, remove two screws that secure filter (2) to the fuel cap. Remove filter (2), valve (1), and the gaskets.

3. Remove the fuel strainer from the filler neck.

4. Wash the cap and the strainer in a clean, nonflammable solvent.

5. Inspect the tank cap seal. If the seal is damaged, replace the seal.

6. Replace the filter, the valve, the gaskets, and the screws. Use a 9X-2205 Cap Filter Kit.

7. Install the strainer.

8. Install the fuel cap. Rotate the fuel cap clockwise until three tabs (5) drop into the slots in the adapter. Rotate lever (3) clockwise until the lever stops. Lower lever (3) over locking tab (4).

i00072950

Fuel Tank Water and Sediment - Drain

SMCS Code: 1273-543-M&S

The drain valve is under the fuel tank at the rear of the machine.

1. Open the access cover (if equipped).

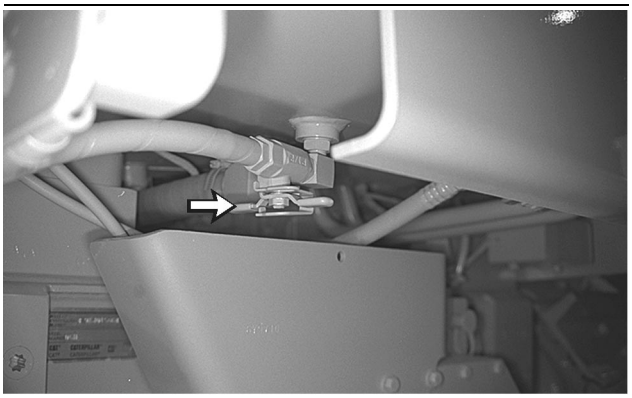


Illustration 205 g00103760

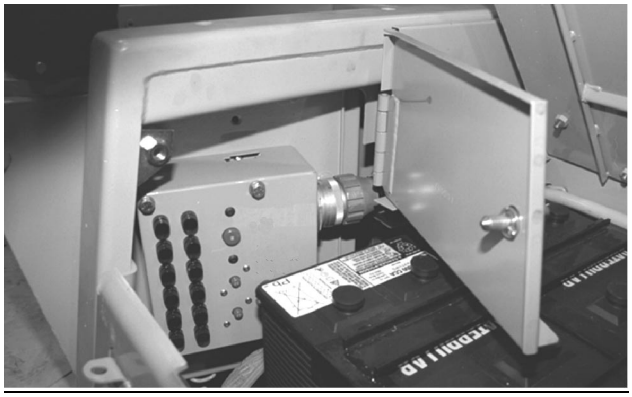
2. Open the drain valve. Allow the water and the sediment to drain into a suitable container.

3. Close the drain valve. Close the access cover (if equipped).

i00753704

Fuses - Replace

SMCS Code: 1417-510



g00340187

Illustration 206

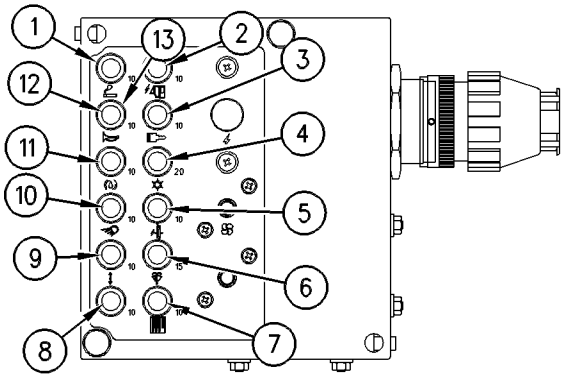
The fuse panel is located in the battery compartment on the left side of the machine.

Fuses – Fuses protect the electrical system from damage that is caused by overloaded electrical circuits. Replace a fuse if the element separates. If the fuse of a particular electrical system requires frequent replacement, check the electrical circuit. Repair the electrical circuit, if necessary.

NOTICE
Always replace fuses with the same type and capacity fuse that was removed. Otherwise, electrical damage could result.

NOTICE
If it is necessary to replace fuses frequently, an electrical problem may exist.

Contact your Caterpillar dealer.



g00103744

Illustration 207

Cigar Lighter (1) – 10 Amp

Electrical Power for Cab (2) – 10 Amp

Key Start Switch (3) – 10 Amp

Air Conditioner (4) – 20 Amp

Electronic Clutch/Brake (5) – 10 Amp

Windshield Wiper/Washer (6) – 15 Amp

Caterpillar Monitoring System Panel (7) – 10 Amp

Auxiliary Circuit (8) – 10 Amp

Directional Control (9) – 10 Amp

Flood Lights (10) – 10 Amp

Brake System (11) – 10 Amp

Horn (12) – 10 Amp

Dump Valve (13) – 10 Amp

i01032547

Horn - Test

SMCS Code: 7402-081

Illustration 208 g00545735

Push the switch downward in order to sound the forward horn.

i00907501

Hydraulic System Oil - Change

SMCS Code: 5050-044

⚠ WARNING

At operating temperature, the hydraulic tank is hot and under pressure.

Hot oil and components can cause personal injury. Do not allow hot oil or components to contact skin.

Remove the filler cap only when the engine is stopped, and the filler cap is cool enough to touch with your bare hand. Remove the filler cap slowly to relieve pressure.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the machine. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide”, for tools and supplies suitable to collect and contain fluids in Caterpillar machines.

Dispose of all fluids according to local regulations and mandates.

Operate the machine in order to warm the oil.

Park the machine on level ground. Lower the bulldozer blade to the ground and apply slight downward pressure. Engage the parking brake and stop the engine.

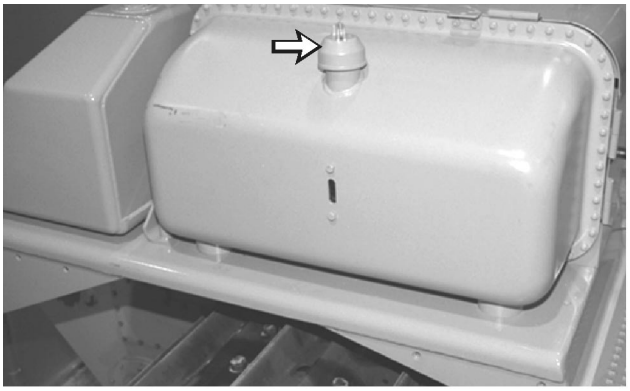


Illustration 209 g00462980

1. Remove the hydraulic tank filler cap slowly in order to relieve any pressure.
2. Wash the filler strainer and the filler cap in a clean nonflammable solvent.

Illustration 210 g00104433

3. Remove the oil drain plug. The oil drain plug is located under the right rear of the machine.
4. Attach a hose to a 1 inch NPT pipe nipple. This 1 inch NPT pipe nipple should have a length of 100 mm (4 inch).
5. Install the pipe nipple into the drain plug opening.
6. Rotate the pipe nipple clockwise in order to open the internal drain valve. Allow the oil to drain into a suitable container.
7. Remove the pipe nipple. The valve for the hydraulic tank will close.

8. Clean the drain plug and install the drain plug. Tighten the drain plug to a torque of 68 ± 7 N·m (50 ± 5 lb ft).

9. See Operation and Maintenance Manual, “Hydraulic System Oil Filter - Replace”. Change the hydraulic system filter.

10. Install the filler strainer.

11. See Operation and Maintenance Manual, “Refill Capacities” in order to determine the amount of hydraulic oil that is needed to fill the hydraulic oil tank. Fill the hydraulic oil tank.

12. Inspect the filler cap gasket. Replace the gasket if damage or wear is evident.

13. Install the filler cap.

14. Start the engine. Run the engine for a few minutes.

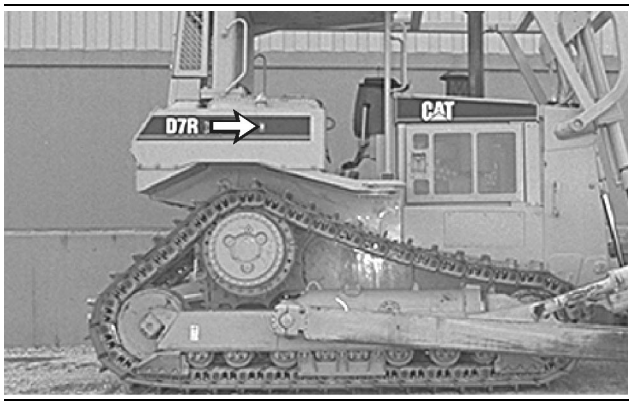


Illustration 211 g00104434

15. Maintain the oil level to the “FULL” mark in the sight gauge. Add oil, if necessary.

16. Stop the engine.

i00907643

Hydraulic System Oil Filter - Replace

SMCS Code: 5068-510

⚠ WARNING

At operating temperature, the hydraulic tank is hot and under pressure.

Hot oil and components can cause personal injury. Do not allow hot oil or components to contact skin.

Remove the filler cap only when the engine is stopped, and the filler cap is cool enough to touch with your bare hand. Remove the filler cap slowly to relieve pressure.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the machine. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide”, for tools and supplies suitable to collect and contain fluids in Caterpillar machines.

Dispose of all fluids according to local regulations and mandates.

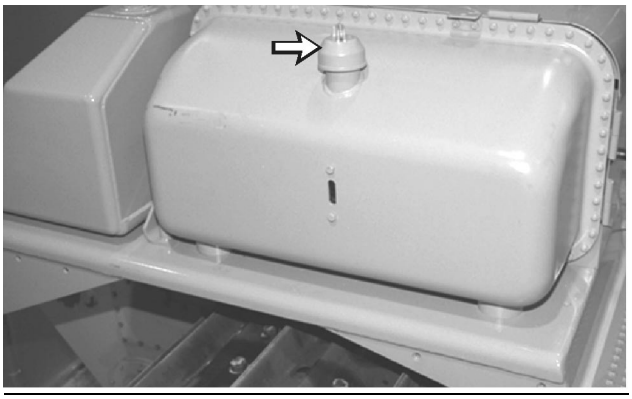


Illustration 212 g00463007

1. The hydraulic tank is on the right side of the machine. Slowly remove the hydraulic tank filler cap in order to relieve the system pressure.

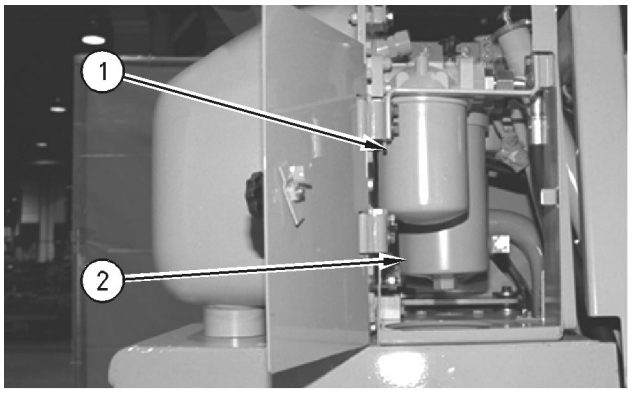


Illustration 213 g00463703

2. Open the access door that is on top of the hydraulic tank. Also, open the access door that is on the side of the hydraulic tank.

3. Remove filter group (1) and properly discard filter group (1). Remove filter group (2) with a wrench. Remove the filter element and properly discard the filter element.

4. Wash the housing for filter group (2) in clean, nonflammable solvent. Clean the filter bases with a clean cloth in order to remove all of the old filter seals.

5. Install a new filter element in filter group (2). Apply a thin coat of oil to the seals on the new filter element.

6. Install filter group (2). Tighten the new filter group to a torque of 60 ± 10 N·m (44.3 ± 7.4 lb ft).

7. Install a new filter group (1) by hand. When the filter contacts the base, tighten the filter for an additional 3/4 turn.

8. Remove the retainer ring from the oil filler tube.

9. Remove the strainer from the oil filler tube.

10. Wash the screen in a clean nonflammable solvent.

11. Inspect the seal on the filler cap. Replace the seal if the seal is worn or if the seal is damaged.

12. Install the strainer, the retainer ring, and the cap.

Illustration 214 g00104435

13. Maintain the hydraulic oil to the “FULL” mark in the sight gauge.

i00908319

Hydraulic System Oil Level - Check

SMCS Code: 5056-535-FLV; 7479

⚠ WARNING

At operating temperature, the hydraulic tank is hot and under pressure.

Hot oil and components can cause personal injury. Do not allow hot oil or components to contact skin.

Remove the filler cap only when the engine is stopped, and the filler cap is cool enough to touch with your bare hand. Remove the filler cap slowly to relieve pressure.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the machine. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide”, for tools and supplies suitable to collect and contain fluids in Caterpillar machines.

Dispose of all fluids according to local regulations and mandates.

The hydraulic tank is on the right rear side of the machine.

Illustration 215 g00104436

1. Maintain the oil level to the “FULL” mark in the sight gauge.

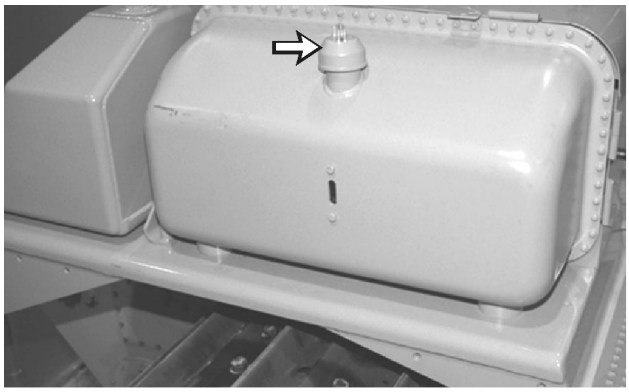


Illustration 216 g00462980

2. If the hydraulic system requires additional hydraulic oil, remove the filler cap and add oil through the filler tube.

3. Clean the filler cap and install the filler cap.

i00078314

Lift Cylinder Yoke Bearings - Lubricate

SMCS Code: 5102-086-BD

Illustration 217 g00104380

The fittings are on the left front side of the machine and on the right front side of the machine. Lubricate the bearings by applying grease to the fittings.

i00060978

Oil Filter - Inspect

SMCS Code: 1318-507; 3067-507; 5068-507

Inspect A Used Filter for Debris

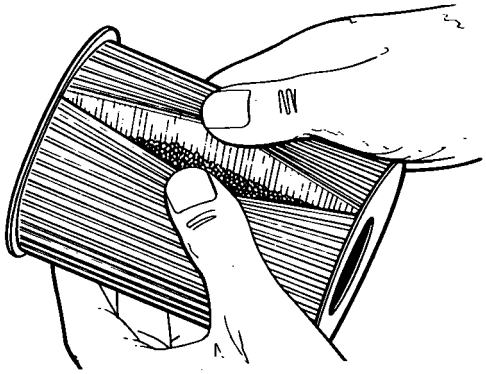


Illustration 218 g00100013

The element is shown with debris.

Use a **4C-5084** Filter Cutter to cut the filter element open. Spread apart the pleats and inspect the element for metal and for other debris. An excessive amount of debris in the filter element can indicate a possible failure.

If metals are found in the filter element, a magnet can be used to differentiate between ferrous metals and nonferrous metals.

Ferrous metals can indicate wear on steel parts and on cast iron parts.

Nonferrous metals can indicate wear on the aluminum parts of the engine such as main bearings, rod bearings, or turbocharger bearings.

Small amounts of debris may be found in the filter element. This could be caused by friction and by normal wear. Consult your Caterpillar dealer in order to arrange for further analysis if an excessive amount of debris is found.

Using an oil filter element that is not recommended by Caterpillar can result in severe engine damage to engine bearings, to the crankshaft, and to other parts. This can result in larger particles in unfiltered oil. The particles could enter the lubricating system and the particles could cause damage.

i00078842

Pivot Shaft Oil Level - Check

SMCS Code: 4153-535-FLV

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

Illustration 219 g00104456

The sight gauge for the oil reservoir is on the left side of the machine. Maintain the oil within the limits of the sight gauge.

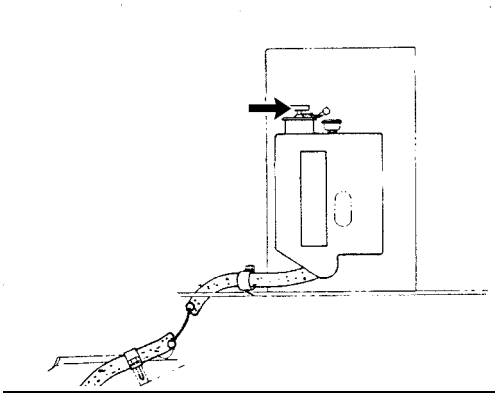


Illustration 220 g00104448

In order to fill the oil reservoir, open the access door on the left side of the machine. Remove the oil filler cap in order to add the oil to the oil reservoir.

i00058126

Radiator Core - Clean

SMCS Code: 1353-070; 1805; 1810

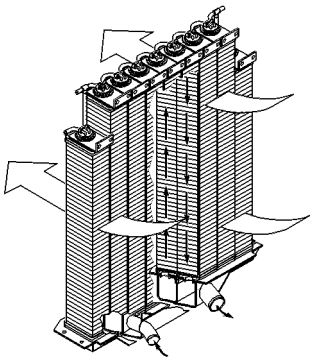


Illustration 221 g00100624

You can use compressed air, high pressure water, or steam to remove dust and other debris from the radiator core. However, the use of compressed air is preferred.

See Special Publication, SEBD0518, “Know Your Cooling System” for the complete procedure for cleaning the radiator core.

i00058123

Radiator Pressure Cap - Clean/Replace

SMCS Code: 1353-070-Z2; 1353-510-Z2

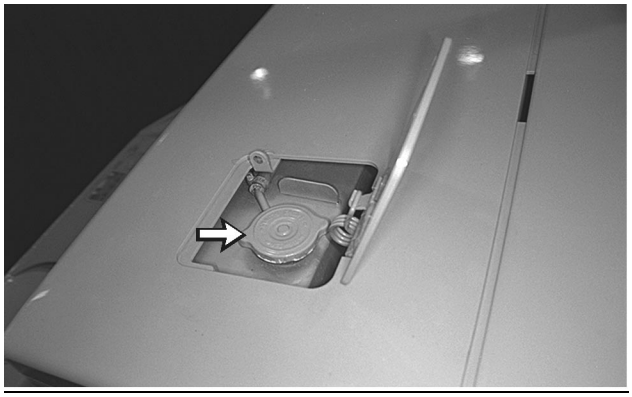


Illustration 222 g00100622

1. Slowly remove the radiator cap in order to relieve system pressure.
2. Inspect the radiator cap for damage, for deposits, or for foreign material. Clean the radiator cap with a clean cloth. Replace the radiator cap if the radiator cap is damaged.
3. Install the radiator cap.

i00072383

Recoil Spring Compartment Oil Level - Check

SMCS Code: 4158-535

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

1. Remove the cover plate for the oil filler.

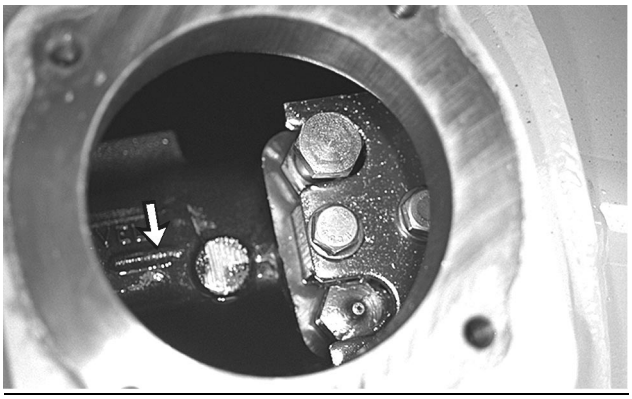


Illustration 223 g00100922

2. Maintain the oil level to the level mark on the dipstick.
3. Install the cover plate.
4. Repeat the procedure for the other recoil compartment.

i00072976

Ripper Linkage and Cylinder Bearings - Lubricate

SMCS Code: 6313-086-BD, L4

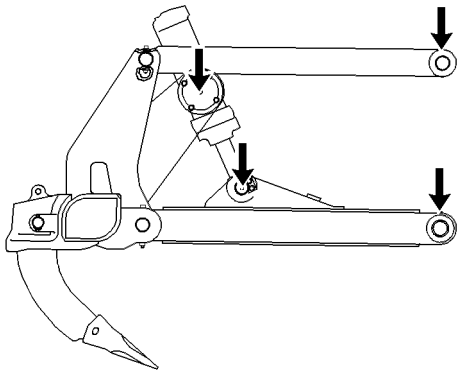


Illustration 224 g00103773

Lubricate eleven grease fittings.

i00925689

Ripper Tip and Shank Protector - Inspect/Replace

SMCS Code: 6808-040; 6808-510; 6810; 6812-040; 6812-510

If equipped:

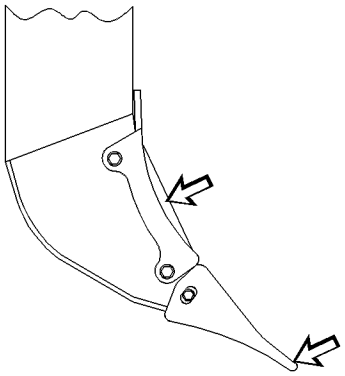


Illustration 225 g00550432

When the ripper tip is worn close to the shank, replace the ripper tip. When the shank protector is worn close to the shank, replace the shank protector. If the tip is too blunt, the tip will not penetrate properly.

1. Raise the ripper. Place blocking under the ripper. Lower the ripper onto the blocking. The ripper should be high enough so that the ripper tip or the shank protector can be removed. Do not place the ripper too high.
2. If the ripper tip is worn, drive out the pin. Remove the tip and the shank pin retainer.
3. Clean the shank pin retainer and the pin.
4. Install the new tip and the retainer.
5. Install the pin from the opposite side of the retainer.
6. If the shank protector is worn, drive out the pins. Remove the shank protector.
7. Clean the pin retainers and the pins.
8. Install the new shank protector and the retainers.
9. Install the pins from the opposite side of the retainer.
10. Raise the ripper and remove the blocking.
11. Lower the ripper to the ground.

i01178020

Rollover Protective Structure (ROPS) - Inspect

SMCS Code: 7325-040

Illustration 226 g00104495

Inspect the Rollover Protective Structure (ROPS) for bolts that are loose or damaged. Replace any damaged bolts and any missing bolts with original replacement parts only. Tighten the bolts to a torque of 900 ± 100 N·m (663.8 ± 73.8 lb ft).

Note: Apply oil to all bolt threads for the ROPS before you install the bolts. Improper bolt torque can result if you do not apply oil to the threads.

Do not weld reinforcement plates to the ROPS in order to straighten the ROPS. Do not weld reinforcement plates to the ROPS in order to repair the ROPS.

If the ROPS has any cracks in the welds, in the castings, or in any metal section, consult your Caterpillar dealer for repairs.

i00038410

Seat Belt - Inspect

SMCS Code: 7327-040

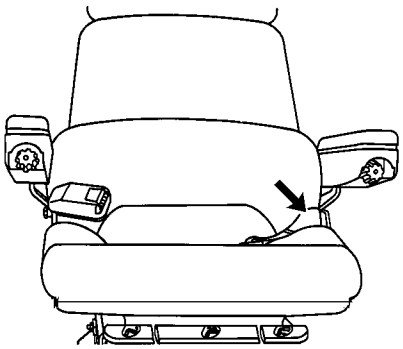


Illustration 227 g00040782

Always check the condition of the seat belt and the condition of the belt mounting hardware before you operate the machine.

Inspect the belt mounting hardware. Replace any belt mounting hardware that is damaged or worn.

Regardless of the appearance, replace the seat belt once during every three year interval.

i00073972

Torque Converter Scavenge Screen - Clean

SMCS Code: 3101-070-MGS; 3105

When you change the transmission oil, clean the torque converter scavenge screen.

1. Remove the bottom guard in order to gain access to the torque converter.
2. Disconnect the hose from the torque converter housing.

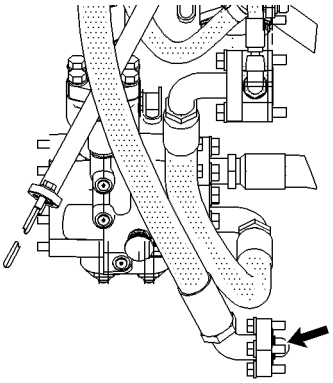


Illustration 228 g00104059

3. Remove the screen from the torque converter housing.
4. Wash the screen in a clean, nonflammable solvent.
5. Install the screen in the torque converter housing.
6. Connect the hose to the torque converter housing.
7. Install the bottom guard.

i01400449

Track Adjustment - Adjust

SMCS Code: 4170-025

⚠ WARNING

Grease is under high pressure.

Grease coming out of the relief valve under pressure can penetrate the body causing injury or death.

Do not watch the relief valve to see if grease is escaping. Watch the track or track adjustment cylinder to see if the track is being loosened.

Loosen the relief valve only one turn.

Move the machine forward. Allow the machine to stop without the use of the service brakes. Adjust the tracks while you are in the machine's typical operating conditions. If packing conditions prevail on the workplace, the tracks should be adjusted with packing material.

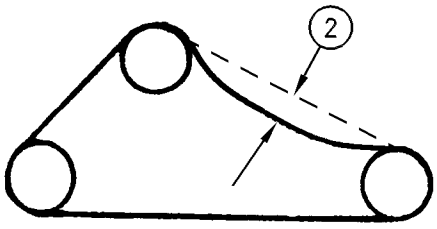


Illustration 229 g00040329

If a machine does not have carrier rollers, the sag in the track is measured between the sprocket and the front idler. The correct adjustment of dimension (2) is 115 ± 10 mm (4.5 ± 0.4 inch) for machines with the STD undercarriage.

The correct adjustment of dimension (2) is 127 ± 10 mm (5.0 ± 0.4 inch) for D7R machines with the LGP undercarriage.

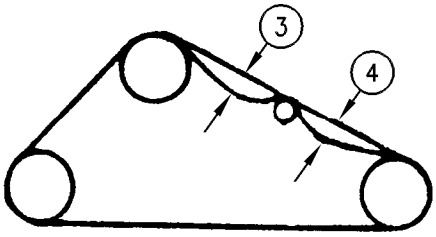


Illustration 230 g00104000

If the machine is equipped with a carrier roller, the sum of the correct adjustment of dimension (3) and dimension (4) is 130 ± 10 mm (5.1 ± 0.4 inch).

Loose Track Adjustment

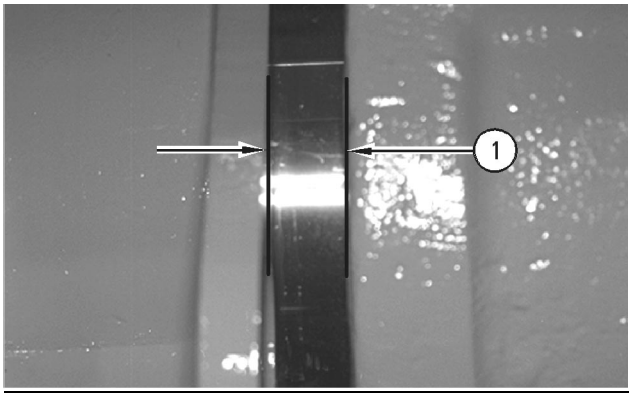


Illustration 231 g00040335

NOTICE
Do not attempt to tighten track when dimension (1) is 138 mm (5.4 inch) or more.

Contact your Caterpillar dealer for track service or instructions.

1. Remove the access cover.

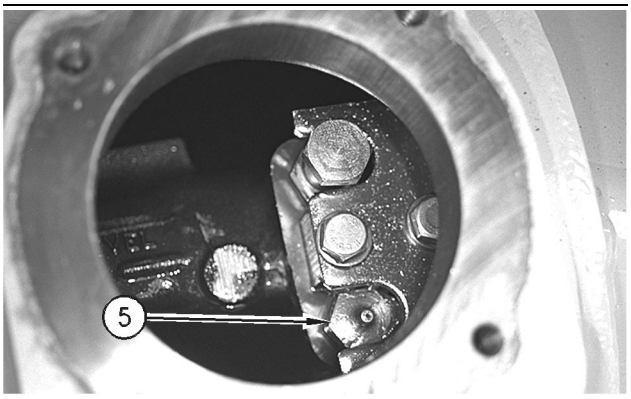


Illustration 232 g00104001

2. Add multipurpose grease (MPGM) through track adjustment valve (5). Add the MPGM until dimension (2) is correct.

3. Operate the machine back and forth in order to equalize the pressure. Allow the machine to coast to a complete stop. Do not use the brakes.

4. Remeasure dimension (2).

Tight Track Adjustment

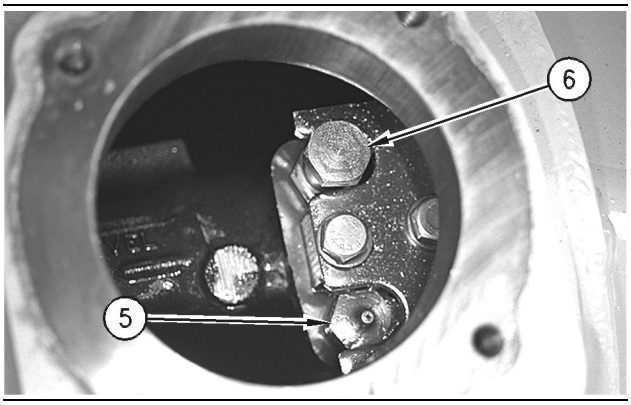


Illustration 233 g00104002

1. Remove the access cover.
2. Loosen relief valve (6) by one turn of 360 degrees. Allow the grease to escape.
3. Close the relief valve.
4. Add MPGM through track adjustment valve (5). Add grease until dimension (2) is correct.
5. Operate the machine back and forth in order to equalize the pressure. Allow the machine to coast to a complete stop. Do not use the brakes.
6. Remeasure dimension (2). Repeat Steps 4 and 5 until dimension (2) is correct.
7. Install the access cover.

Bolt Torque for Track Shoes

The torque requirement for track shoe bolts is 400 ± 70 N·m (300 ± 50 lb ft). Tighten the bolts for an additional 120 degrees. If you are using bolts with a master link, tighten the bolts to a torque of 400 ± 70 N·m (300 ± 50 lb ft). Then, tighten the bolts for an additional 180 degrees.

i00078416

Track Adjustment - Check

SMCS Code: 4170-535

Illustration 234 g00104399

Check the track adjustment. Check the track for wear and for excessive dirt buildup.

If the track appears to be too tight or too loose, see Operation and Maintenance Manual, “Track Adjustment - Adjust”.

i01123943

Track Pins - Inspect

SMCS Code: 4175-040-PN

⚠ WARNING

Fingers can be burned from hot pins and bushings.

The pins and bushings in a dry joint can become very hot. It is possible to burn the fingers if there is more than brief contact with these components.

Use the recommendations in order to extend the life of the undercarriage. Use the recommendations in order to avoid excessive downtime.

1. During the machine operation, listen for unusual squeaking and for unusual squealing. This can indicate a dry joint.
2. Check the machine for dry joints weekly. Check for dry joints immediately after machine operation. After machine operation, lightly touch the end of each track pin or bushing. Touch the track pin or the track bushing with the back of your hand. Make a mark on any dry track pin joint that is very hot to the touch.

3. Do not hit the ends of the track pins with a sledge hammer in order to loosen the track joints.

NOTICE
Striking the end of a track pin introduces a significant amount of end play into the track joint and can result in early failures.

Consult your Caterpillar dealer's Custom Track Service expert if you detect dry joints or leaks. Your Caterpillar dealer's Custom Track Service expert can perform track inspection.

i01024746

Track Roller Frame Guides - Inspect

SMCS Code: 4177-040

Measure the rotational movement of the front roller frame relative to the rear roller frame.

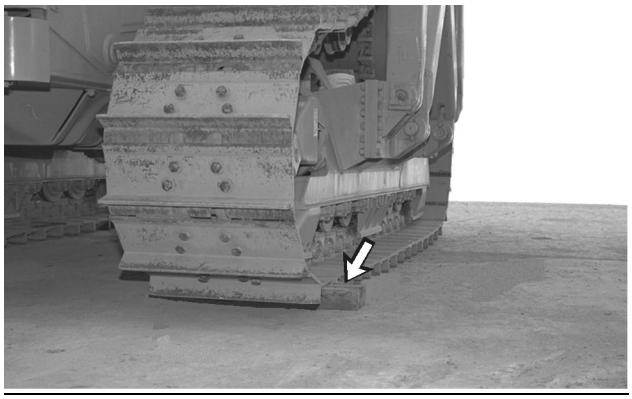


Illustration 235 g00427478
Typical example

1. Raise the front of the machine. Place a 100 mm (4 inch) block under the outside edge of a track grouser. Place the block near the front track idler. Lower the machine onto the block.

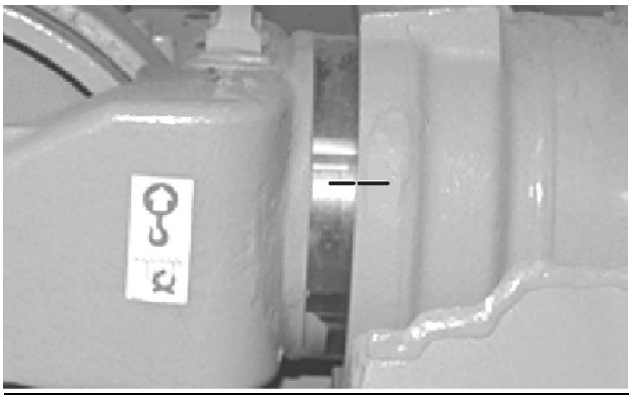


Illustration 236 g00414726
Typical example

2. Use a grease pencil to make a mark on the tubular section of the front roller frame. Make a mark on the rear of the roller frame. This mark should correspond with the mark that is on the tubular section.

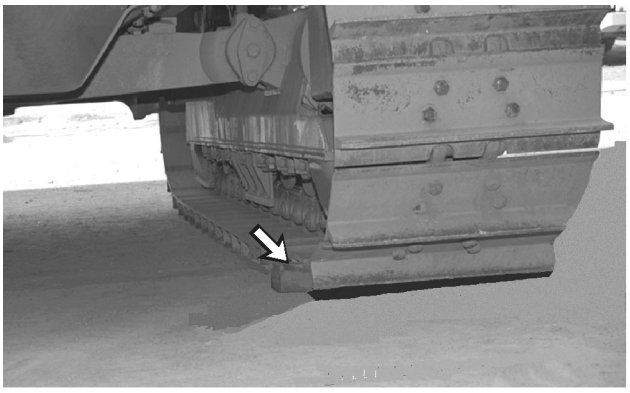


Illustration 237 g00427479
Typical example

3. Raise the front of the machine. Place the block under the inside edge of the same track grouser. Lower the machine onto the block.

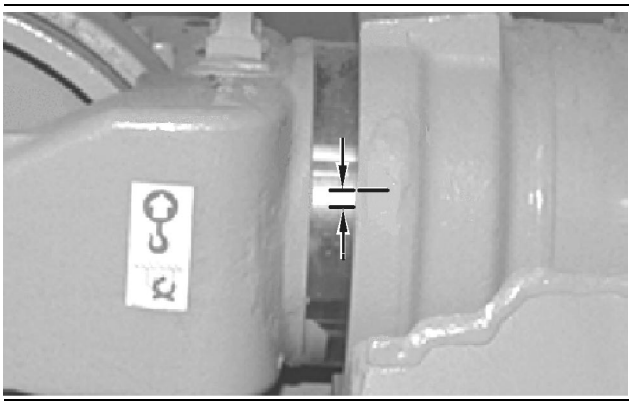


Illustration 238 g00414727
Typical example

4. Put a mark on the tubular section of the front roller frame. This mark should correspond with the mark on the rear roller frame. Measure the distance between the two marks on the front roller frame.

If the distance between the two marks is greater than 4.5 mm (.18 inch), inspect the track roller frame guides for wear.

Repeat the entire procedure for the other side of the machine.

NOTICE

Never build up the track roller frame guides with hard-face welding. This will cause serious wear damage to the guide slots in the front track roller frame.

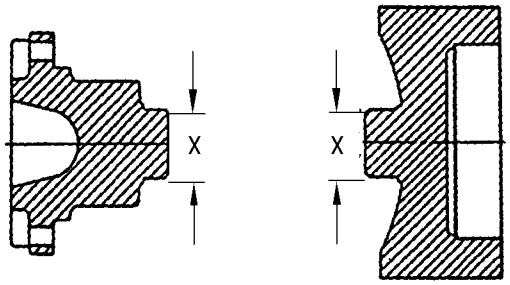


Illustration 239 g00039582

If the dimension (X) is less than 71.5 mm (2.81 inch), replace the track roller frame guides. Consult your Caterpillar dealer for information or for service.

i01146867

Transmission Magnetic Screen - Clean

SMCS Code: 3030-070-MGS

When you change the transmission oil, clean the magnet assembly and the screen.

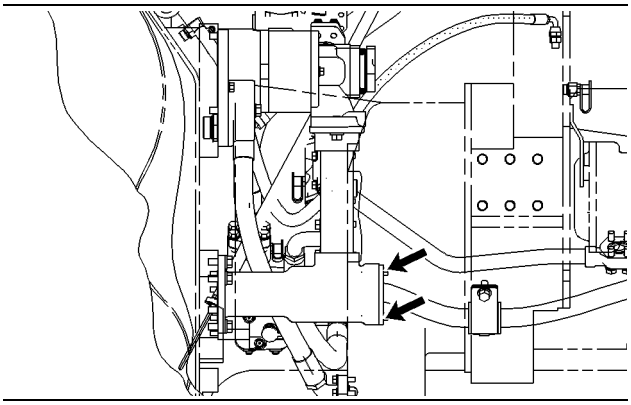


Illustration 240 g00103746

1. Remove the bottom guard for access to the screen group.

2. Remove the nuts which hold the cover to the housing.

3. Remove the screen and the magnet assembly from the housing.

4. Wash the screen and the magnet assembly in a clean, nonflammable solvent.

5. Inspect the seal. If the seal is damaged, install a new seal.

6. Install the screen and the magnet assembly.

7. Install the cover on the screen housing.

8. Install the bottom guard.

i01137803

Transmission Oil - Change

SMCS Code: 3030; 3080-044

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Operate the engine in order to warm the oil. Park the machine on level ground. Lower all implements to the ground. Apply slight downward pressure.

Engage the parking brake switch. Stop the engine.

Some machines may be equipped with ecology drain valves.

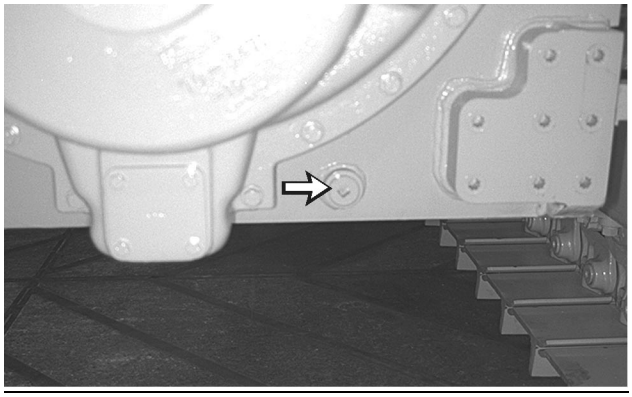


Illustration 241 g00103783

1. Remove the transmission oil drain plug. Drain the oil into a suitable container.
2. Clean the transmission oil drain plug and install the transmission oil drain plug.
3. Change the filter element. See Operation and Maintenance Manual, “Transmission Oil Filter - Replace”.
4. Clean the transmission magnetic screen. See Operation and Maintenance Manual, “Transmission Magnetic Screen - Clean”.
5. Open the access cover for the transmission oil filler cap. The access cover is on the right fender of the machine.

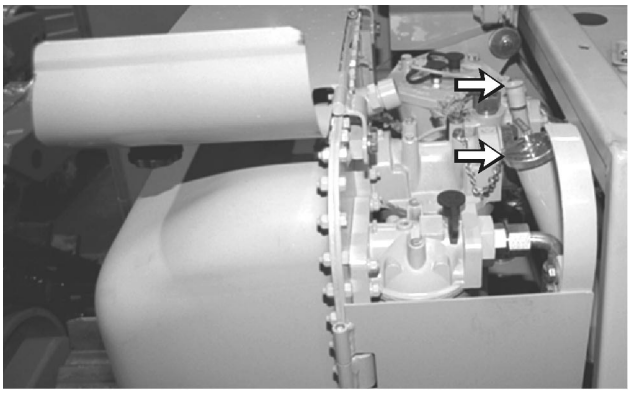


Illustration 242 g00602393

6. Remove the transmission oil filler cap.
7. Add oil. To determine the correct amount of oil, see Operation and Maintenance Manual, “Refill Capacities”.
8. Clean the transmission oil filler cap and install the transmission oil filler cap.
9. Maintain the oil level to the “FULL” mark on the dipstick.
10. Unscrew the transmission breather and remove the transmission breather. The transmission breather is located on the top of the bevel gear case. Remove the floorplate in order to access the transmission breather.
11. Wash the transmission breather in a clean nonflammable solvent.
12. Install the transmission breather.

i01097929

Transmission Oil Filter - Replace

SMCS Code: 3067-510

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Initially, replace the transmission oil filter after 250 service hours. Also, replace the transmission oil filter after the initial 500 service hour interval. Thereafter, replace the transmission oil filter after every 500 service hours.

The transmission oil filter is located behind the access cover on the right side of the machine.

Illustration 243 g00589924

1. Remove the filter housing drain plug. The filter housing drain plug is located under the fender on the right side of the machine. Drain the oil into a suitable container. Reinstall the filter housing drain plug.

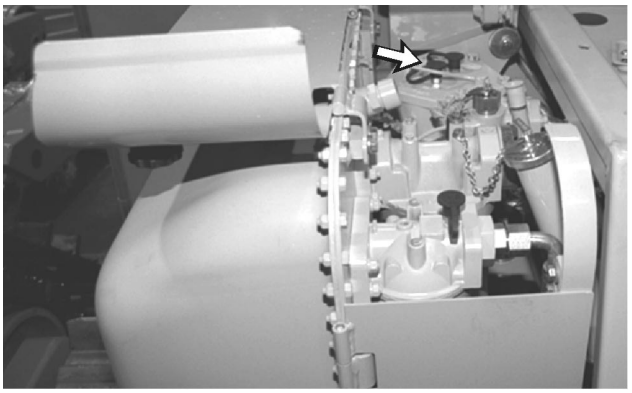


Illustration 244 g00463529

2. Remove the filter element cover assembly.

3. Remove the filter element and properly discard the filter element.

4. Clean the filter element housing with a clean cloth.

5. Inspect the seal. If the seal is damaged, replace the seal.

6. Install the new filter element. Install the filter element housing cover.

7. Start the engine.

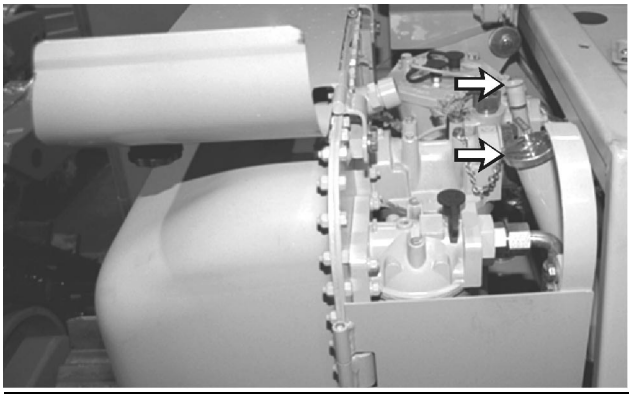


Illustration 245 g00602393

8. Maintain the oil level to the “FULL” mark on the dipstick. If necessary, add oil through the filler tube.

9. Stop the engine.

i01137892

Transmission Oil Level - Check

SMCS Code: 3030-535-FLV; 3080-535-FLV

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

The transmission oil dipstick is under the access cover on the right fender of the machine.

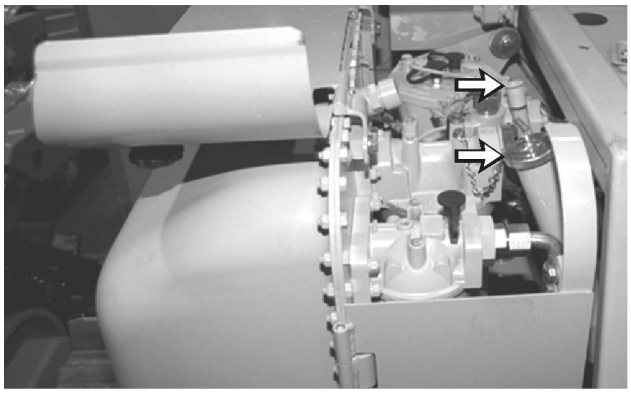


Illustration 246 g00602393

1. Open the access cover. Check the dipstick when the engine is running at low idle and the oil is at operating temperature. Maintain the oil between the “LOW” mark and the “FULL” mark.

Note: When you are operating the machine on severe slopes, the quantity of oil in the transmission can be increased up to 10 percent. When you are operating with the increased oil quantity, prolonged operation in some machines can cause high transmission oil temperatures. After the work on the severe slopes has been completed, drain the excessive oil quantity from the bevel gear case.

2. Remove the filler cap for the power train. If necessary, add oil.

3. Clean the filler cap and install the filler cap.

   Replace the filter element if the transmission oil filter indicator comes on during operation. See Operation and Maintenance Manual, “Transmission Oil Filter - Replace”.

4. Close the access cover.

i00073242

Transmission Scavenge Screen - Clean

SMCS Code: 3030-070-MGS

When you change the transmission oil , clean the scavenge screen.

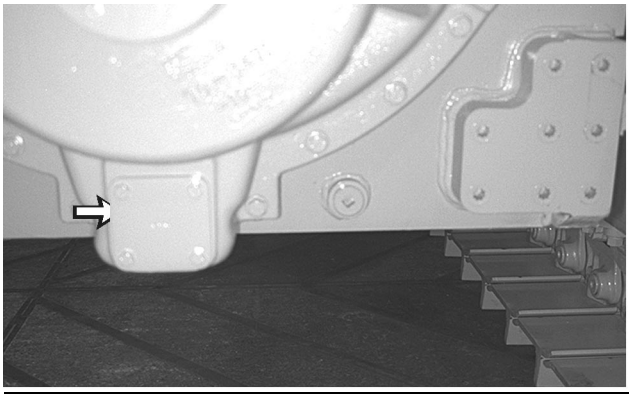


Illustration 247 g00104061

1. Remove the cover from the rear of the transmission. The scavenge screen is located behind the cover.

2. Wash the screen in a clean, nonflammable solvent.

3. Inspect the seal. If the seal is damaged, replace the seal.

4. Install the screen and the cover.

i00078430

Walk-Around Inspection

SMCS Code: 7000-040

NOTICE

Accumulated grease and oil on a machine is a fire hazard.

Remove debris with steam cleaning or high pressure water, at the specified interval in the Maintenance Interval Schedule or each time any significant quantity of oil is spilled on the machine.

Note: Watch closely for leaks. If leaking is observed, find the source of the leak and correct the leak. If leaking is suspected or leaking is observed, check the fluid levels more frequently.

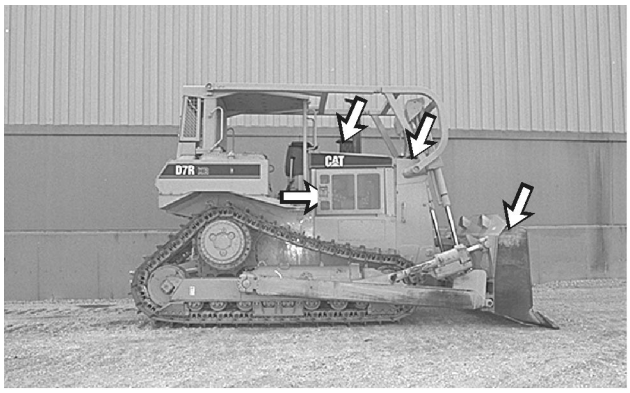


Illustration 248 g00104413

- Inspect all of the implements for damage or for excessive wear. Repair the implements if the implements are damaged.
- Inspect the attachment cylinders and the attachment linkage for damage or for excessive wear. Repair any damages.
- Inspect the lights for broken bulbs and for broken lenses. Replace any broken bulbs and any broken lenses.
- Remove any trash buildup around the engine. Remove any trash buildup that is under the floorplate. Also, remove any dirt buildup that is on the top of the crankcase guard.
- Inspect the cooling system for leaks and repair any cooling system leaks. Check the hoses, the radiator fins, the radiator cap, and the drain area.
- Inspect the engine precleaner screen for any dirt buildup and for debris buildup. Remove any dirt and debris.
- Inspect the engine compartment for leaks and repair any engine compartment leaks. Check around all seals and around all covers.
- Inspect the condition of the steps and of the handholds. Inspect the steps and the handholds for cleanliness. If necessary, repair the steps or clean the steps. Inspect the Rollover Protective Structure (ROPS) for damage. Inspect the Falling Object Protective Structure (FOPS) for damage. Consult your Caterpillar dealer for any necessary repairs.

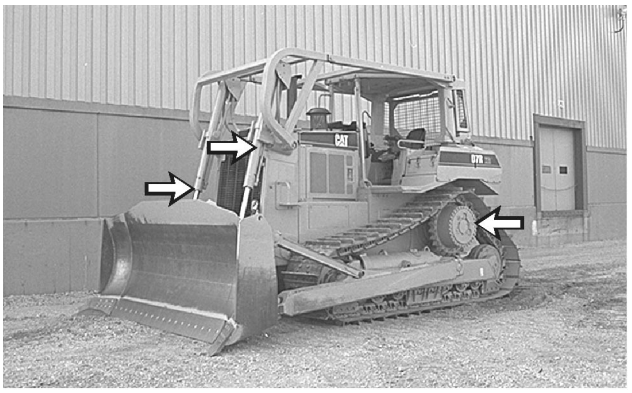


Illustration 249 g00104415

- Inspect the hydraulic system for leaks. Repair any hydraulic system leaks. Inspect the hoses, the seals, and the flanges.
- Inspect the final drive for leaks. Repair any final drive leaks.

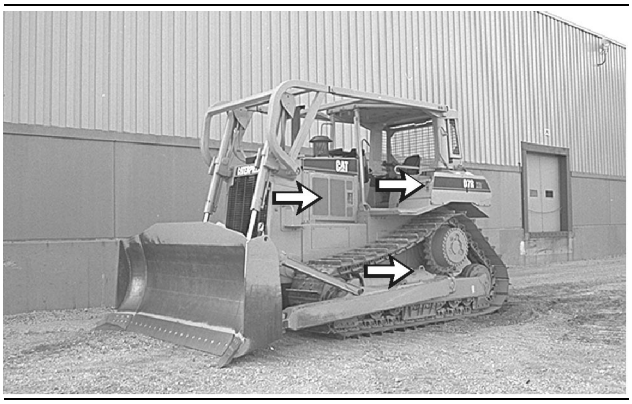


Illustration 250 g00104416

- Make sure that the covers and the guards are secured. Inspect the covers and the guards for damage, for loose bolts, and for missing bolts. Replace missing bolts. Tighten the replaced bolts to the proper torque.
- Inspect the transmission for leaks. Repair any transmission leaks. Check around the seals and around the covers. Also, check the hoses around the transmission.

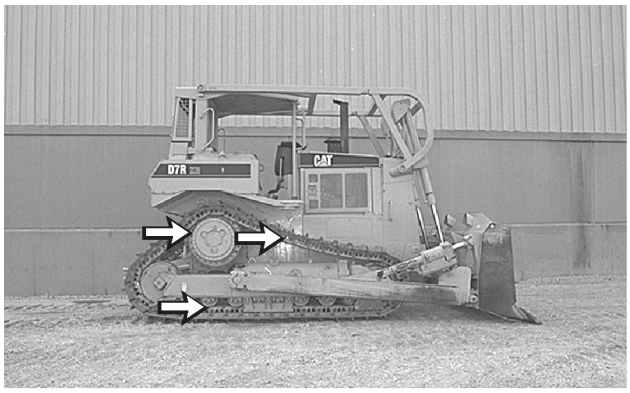


Illustration 251 g00104417

- Inspect the tracks. Repair the tracks if the tracks are damaged or excessively worn. Tighten any loose bolts. Replace missing bolts. Check the tracks for excessive dirt buildup. Check the tightness of the track. Refer to Operation and Maintenance Manual, “Tracks Adjustment - Check”.
- Inspect the guiding guards for the track. Check for loose bolts or for missing bolts. Check the track components for damage and for wear. Replace missing bolts.
- Inspect the operator compartment for cleanliness. Remove any trash buildup and any dirt buildup.
- Inspect the instrument panel. Repair any broken gauges and any broken lights.

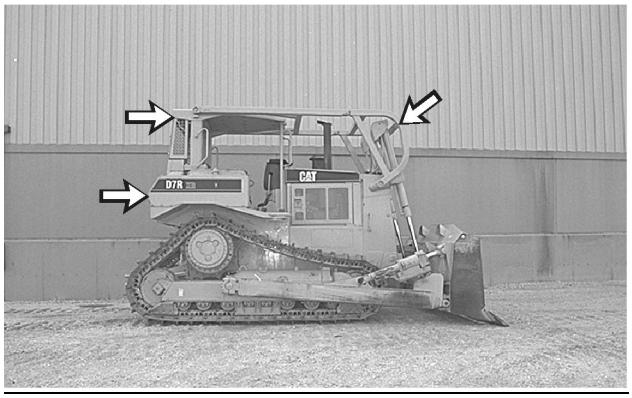


Illustration 252 g00104418

- Make sure that the horn, the backup alarm, the lights, the guards, and the shield are working properly.

i01104219

Winch Filter and Magnetic Strainer - Replace/Clean

SMCS Code: 5163-070-FI, MGS; 5163-510-FI, MGS

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

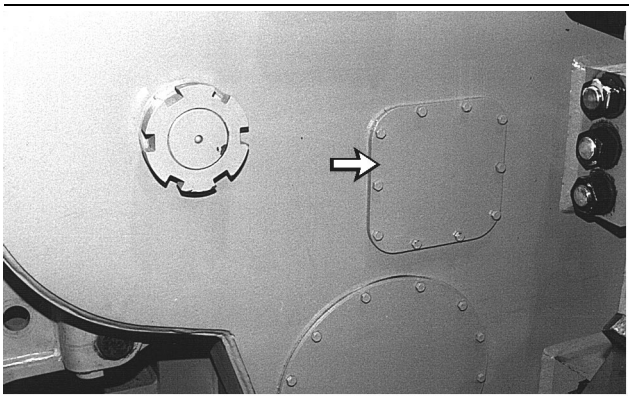


Illustration 253 g00040007

1. Remove the cover and the gasket.

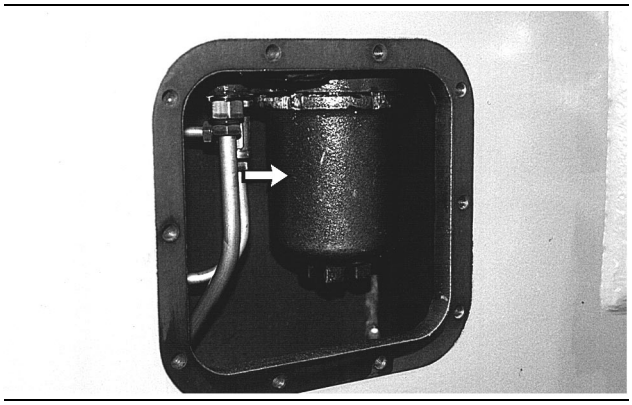


Illustration 254 g00040006

2. Remove the filter element housing with a wrench.

3. Remove the filter element from the filter element housing.

4. Clean the filter element housing with a clean cloth.

5. If the seal is damaged, replace the seal. Lubricate the seals with clean oil.

6. Install a new filter element into the filter element housing.

7. Tighten the filter element housing to a torque of27 ± 4 N·m (20 ± 3 lb ft).

8. Install the cover and the gasket.

Clean the Magnet and Clean the Strainer

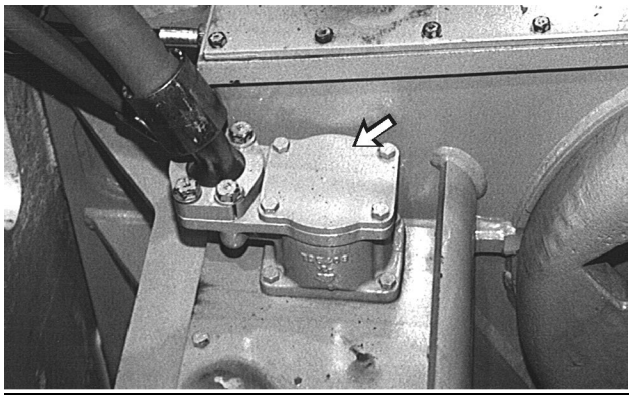


Illustration 255 g00040008

1. Remove the cover, the magnet, and the strainer.

2. Clean these parts in a clean nonflammable solvent.

3. Install the strainer and the magnet.

4. Install the cover.

i00052156

Winch Oil - Change

SMCS Code: 5163-044

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

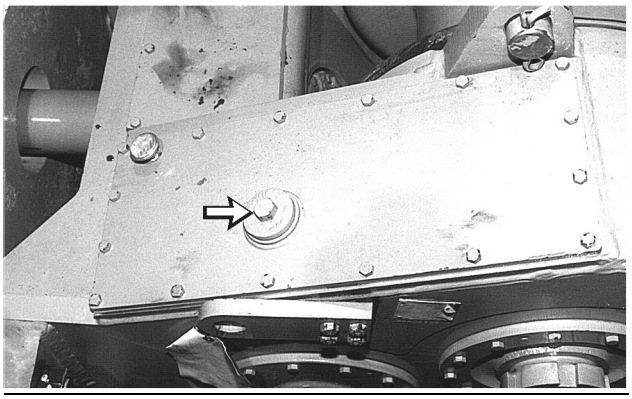


Illustration 256 g00039947

1. Remove the oil filler plug.

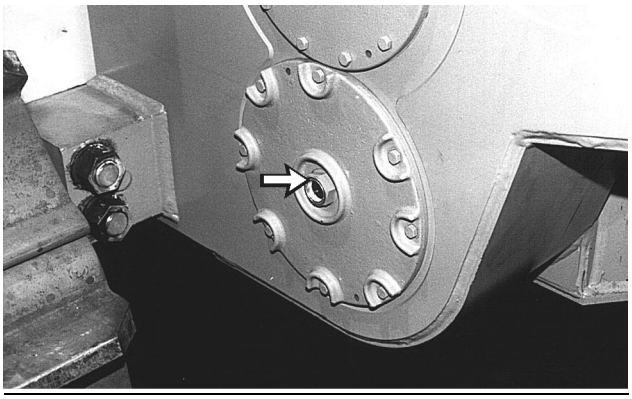


Illustration 257 g00039945

2. Remove the drain plug on the bottom of the winch. Allow the oil to drain into a suitable container.

3. Inspect the plug seal. If necessary, replace the plug seal.

4. Clean the drain plug and install the drain plug.

5. Fill the oil compartment until oil is visible in the sight gauge. See Operation and Maintenance Manual, “Refill Capacities”.

6. Clean the filler plug and install the filler plug.

7. Run the engine at low idle. Maintain the oil level so that the oil level is visible in the sight gauge.

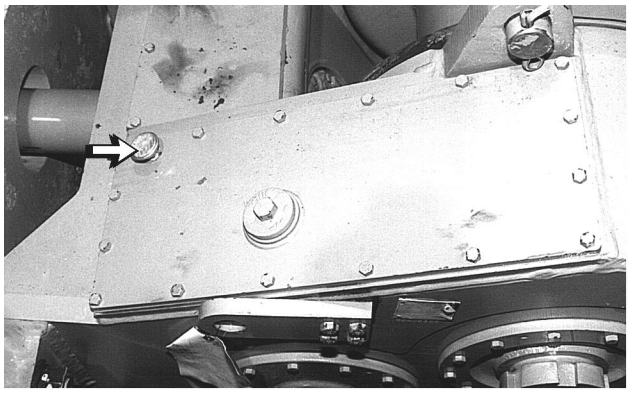


Illustration 258 g00039952

8. Remove the breather on top of the winch case. Wash the breather in a clean nonflammable solvent. Install the breather.

i00038229

Winch Oil Level - Check

SMCS Code: 5163-535-FLV

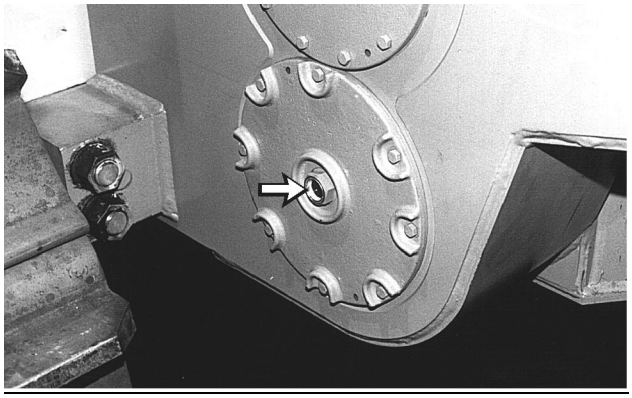


Illustration 259 g00039951

When the engine is at low idle, the oil should be visible in the sight gauge.

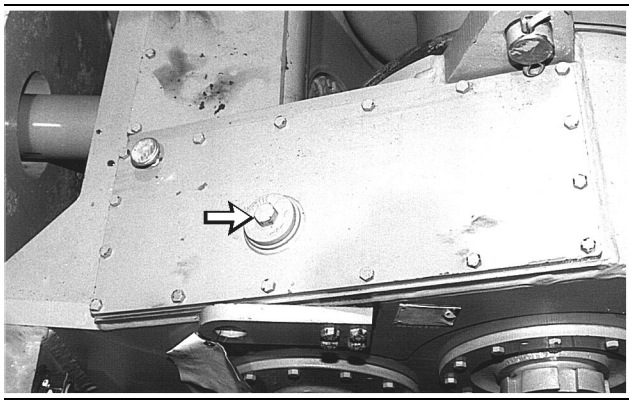


Illustration 260 g00039947

Remove the oil filler plug. If necessary, add oil through the oil filler cap.

Check for oil leaks around the covers and around the hoses. Repair any oil leaks.

i01381183

Winch Wire Rope - Install

SMCS Code: 5163-012

If equipped:

⚠ WARNING

Personal injury or death can result from worn wire rope cable.

Worn or frayed cable could break causing injury.

Check the wire rope cable. If cable is worn or is frayed install a new cable.

PA57VS

The cable is attached to the drum on the winch with a cable ferrule. The ferrule is placed into a socket on the drum.

Use the following table to order the cable.

Table 21

Wire Cable		
Wire Rope Diameter	Recommended Ferrule	Holding Capacity
25 mm (1 inch)	L-8	91 m (300 ft)
29 mm (1.13 inch)	J-9	84 m (276 ft)
32 mm (1.25 inch)	J-10	59 m (193 ft)

1. Put the cable in a straight line behind the tractor.

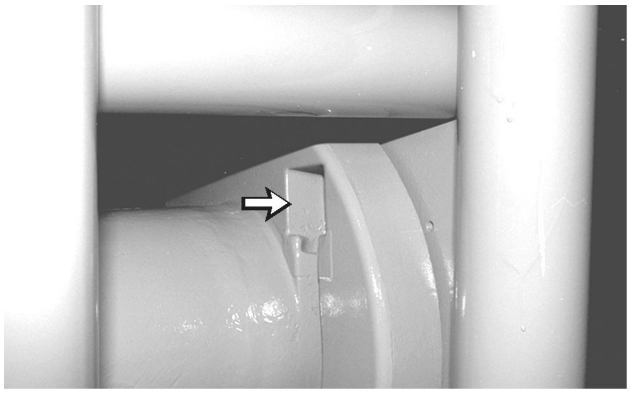


Illustration 261 g00550538

1. Install the ferrule end into the socket .

2. Reel in the cable.

57

The cable is attached to the drum on the winch with a standard cable ferrule. The ferrule is placed into a socket on the drum and the ferrule is secured with a bolt-on retainer.

Ferrules are made in several diameters and lengths. Use the following table to order the cable.

Table 22

Wire Cable		
Wire Rope Diameter	Recommended Ferrule	Holding Capacity
25 mm (1 inch)	L-8	73 m (239 ft)
29 mm (1.13 inch)	J-9	58 m (190 ft)

1. Put the cable in a straight line behind the tractor.

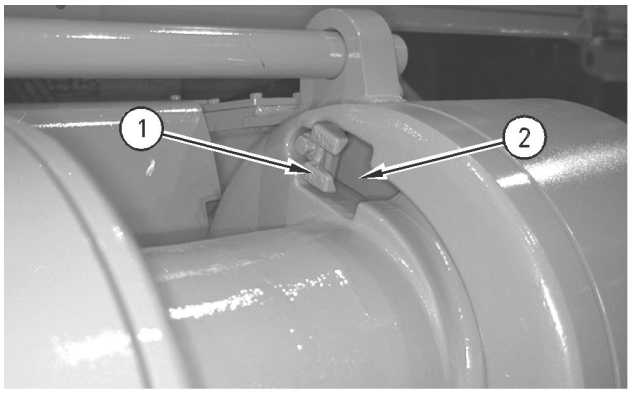


Illustration 262 g00392987

1. Remove ferrule retainer (1). Install the ferrule end into socket (2).

2. Install ferrule retainer (1).

3. Reel in the cable.

i01279658

Window Washer Reservoir - Fill

SMCS Code: 7306-544

NOTICE
When operating in freezing temperatures, use Caterpillar or any commercially available nonfreezing window washer solvent.

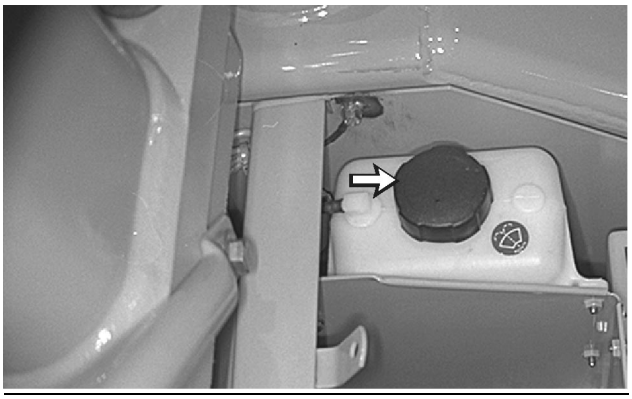


Illustration 263 g00103795

Window Washer – The washer fluid bottle is on the left side of the operator's compartment. Open the access cover. Remove the fluid bottle cap in order to fill the washer fluid bottle.

i01279804

Window Wipers - Inspect/Replace

SMCS Code: 7305-040; 7305-510

Illustration 264 g00103881

Inspect these wiper blades: the front, the right, the left, and the rear. Replace any wiper blades that are damaged or worn. Replace any wiper blades that streak the window.

i01124791

Windows - Clean

SMCS Code: 7310-070; 7340-070

Use commercially available window cleaning solutions to clean the windows.

To clean the outside of the rear window from the inside of the cab, remove the sliding section of the rear window. Use the following procedure in order to remove the sliding section of the rear window.

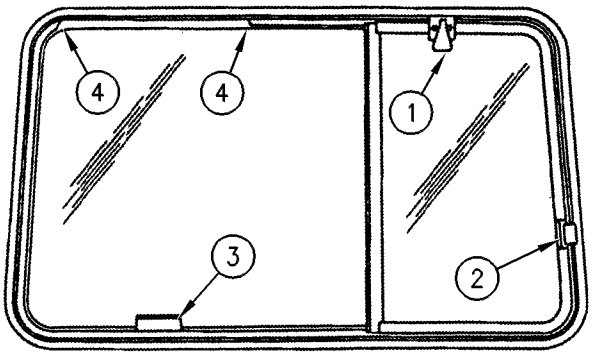


Illustration 265 g00039956

1. Lift latch (1) in order to slide the windows. Squeeze latch (2) in order to move the window from the CLOSED position.

2. Move handle stop (3) to the UP position. To move the handle stop to the UP position, lift the handle and rotate the handle simultaneously. Rotate the handle until the handle is vertical.

3. Move the sliding section of the window to opening (4) in the upper window channel.

4. Tilt the top of the window toward the inside of the cab. Remove the window.

5. Stay inside the cab in order to clean the outside of the rear window.

6. After cleaning, install the sliding section of the rear window.